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CHARLES ELMORE CROPLEY

IN THE

Supreme Court of the United States

OCTOBER TERM, 1947.

No. 280

FUNK BROTHERS SEED COMPANY,
Petitioner,

vs.

KALO INOCULANT COMPANY,
Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SEVENTH CIRCUIT.

BRIEF FOR RESPONDENT.

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BRIEF FOR RESPONDENT.

OPINIONS BELOW.

The opinion of the Circuit Court of Appeals (R. 817-833) is reported in 161 F. (2d) 981.

The District Court did not render an opinion but merely filed a brief memorandum of holdings (R. 744-5), which is unreported. Its findings of fact and conclusions of law will be found beginning at page 745 of the record.

JURISDICTION.

The Judgment of the Circuit Court of Appeals was entered June 12, 1947 (R. 834). The petition for a writ of certiorari was filed August 19, 1947, and granted October 13, 1947 (R. 840).

The jurisdiction of this Court is conferred by Section 240(a) of the Judicial Code, as amended by the Act of February 13, 1925 (28 U. S. C. § 347).

QUESTIONS PRESENTED.

This is an ordinary patent infringement case which involved in the courts below the usual issues of validity and infringement of respondent's patent No. 2,200,532, issued May 14, 1940, to Bond, and entitled "Bacterial Inoculant for Leguminous Plants."

Petitioner did not present any questions in its petition for a writ of certiorari in respect of the concurrent findings of infringement made against it by the courts below,* and hence, the single issue before this Court is whether respondent's patent is valid under the patent statutes R. S. §§ 4886 and 4888 (35 U. S. C. §§ 31, 33)**—invalidity being urged by petitioner upon the grounds (1) that the decision of the Court of Appeals offends a rule of decision that forbids the patenting of a law of nature, and (2) that the claims in suit depend upon functional statements and hence are of a sort condemned in recent decisions of this Court.

In posing the issue, petitioner purports to challenge only the rule of law followed by the court below (Br. p. 3); but

* Therefore, no infringement questions are before the Court. *Crown Cork & Seal Co. v. Gutmann Co.*, 304 U. S. 159, 161; *General Talking Pictures Corp. v. Western Electric Co.*, 304 U. S. 175, 179.

** The provisions of these sections are reproduced in an Appendix, *post* p. 75.

in its statement and in its argument petitioner wholly ignores the facts as found in this case and, by means of assertions based on testimony and evidence rejected by the court below, misinterprets and distorts the opinion of that court. The questions actually presented are these:

(a) Where the facts, as found by the courts below, establish that a successful composite or mixed inoculant had long been prevented by the inhibitive effect exerted on each other by certain strains of legume bacteria, and that the patentee has discovered the existence in nature, contrary to universal belief, of both inhibitive and non-inhibitive strains of the bacteria, and has applied and utilized this scientific knowledge by selecting and combining only noninhibitive strains in the production of a highly useful and desirable product of which the public now has the benefit, did the Circuit Court of Appeals improperly apply to these facts the rule of law that application of scientific knowledge in a successful combination which is of value to mankind is entitled to patent protection? And

(b) Where the subject matter of a patent pertains to a product employing bacterial life which is customarily described and classified not by its physical characteristics but instead by its physiological characteristics, *i.e.*, what it will do, are patent claims which specify, as completely as it is reasonably possible, such physiological characteristics, objectionable under the patent statutes?

STATEMENT.

Petitioner's statement of the case reflects only the view of the facts and the evidence which petitioner advanced in the District Court and which was rejected both by the trial judge and by the court below. It misstates the nature of the Bond invention and of the prior art and is in sore need of supplementing and correcting.

Respondent sued petitioner in the United States District Court for the Southern District of Illinois (R. 2-5) for infringement of respondent's patent No. 2,200,532, for a "Bacterial Inoculant for Leguminous Plants," which was issued May 14, 1940, to respondent upon an application filed August 24, 1938, by Varley Sherman Bond (R. 770-779).

The case was tried in part on formal admissions of petitioner, and in part on oral and documentary evidence. Upon final hearing, the District Court found, "with reluctance,"—it being impressed with "the very great diligence" and "ingenuity" of the patentee and "with the results obtained"—that the claims in suit, although infringed by petitioner, were invalid because not relating to any improvement which could be classified under any of the subjects covered by the Patent Act (R. 744). Accordingly respondent's action was dismissed (R. 754). On respondent's appeal, the court below concurred in the finding that petitioner was guilty of infringement (R. 827-831), but reversed the District Court on validity because it was felt that on the trial judge's own findings it was "obvious" that the patentee had made "an inventive step forward in the art," and that the trial judge had misconceived the legal effect of the undisputed evidence and of his findings of fact made on a conflict in testimony (R. 823-824). As will hereafter more particularly appear, the courts below have concurrently found that the statutory

prerequisites of utility, and ingenuity, exist; and whereas the District Court did not expressly consider and therefore made no finding as to the third prerequisite, *i.e.*, novelty, *the court below has found and petitioner now concedes* (Br. p. 4, footnote 4) *that this fact also exists.*

The case is here on a writ of certiorari to the Circuit Court of Appeals for the Seventh Circuit to review that court's opinion upholding the validity of respondent's patent (R. 817-827).

THE BOND PATENT IN SUIT.

The invention of the Bond patent in suit may be described in nontechnical language as a product adapted to be applied to seeds by farmers prior to planting, for increasing the growth or yield of certain crops, and for increasing, or minimizing the depletion of, the amount of nitrogen compounds contained in the soil. The product (an inoculant) is not a fertilizer; it is not added to the soil; instead it is applied directly to the seeds and infects the plant roots.

The Subject Matter—Leguminous Plants and Legume Bacteria.—For the purposes of this case it may be accepted that the various crops that are important in agriculture fall into two main classes: First, leguminous plants such as alfalfa, clover, beans, peas, etc. (R. 35), and, second, nonleguminous plants such as grasses or grains. Leguminous plants or legumes, as they are sometimes called, are characterized by their ability under certain conditions to take atmospheric nitrogen directly from the air and convert it into organic nitrogenous compounds that are beneficial to plant growth. This is known as "fixing" atmospheric nitrogen (R. 38). Nonleguminous plants do not have this characteristic but instead depend for their nitrogen requirements solely upon the nitrogenous compounds

such as nitrates or ammonium salts that may be present in the soil (R. 37).

It has long been known that the ability of leguminous plants to fix nitrogen from the air depends on the presence of certain bacteria which infect the roots of the plant and form small lumps or nodules (R. 36).* Although the exact mechanism by which nitrogen fixation is accomplished is not known, it is an accepted fact that unless these "root nodules" are formed on the plant roots by the bacteria the plant is unable to fix nitrogen from the air (R. 29 and 30). The growth and protein content of leguminous plants depend, in nitrogen deficient soil, on the amount of nitrogen taken from the atmosphere by the plant.

The "root nodule" bacteria or "legume" bacteria, as they are sometimes called, exist in nature as a plurality of distinct species and it is recognized that any one species will not infect or form nodules on the roots of all species of leguminous plants. Certain species of root nodule bacteria are specific to certain groups of leguminous plants, and a group of plants that will be infected by a single species of bacteria is known as a cross-inoculation group (R. 748, Findings 9 and 10). There are at least six well recognized species of root nodule bacteria which will respectively infect six fairly well defined cross-inoculation groups (R. 39 and 40).** Each species of root nodule

* The plants and the bacteria are said to grow in "symbiotic" relation.

** In bacteriological terminology the root nodule bacteria are known as the genus *Rhizobium*, the six species of bacteria and the corresponding cross-inoculation groups of leguminous plants being:

Species	Cross-inoculation Group
Rhizobium trifolii	Red clover, crimson clover, mammoth clover, alsike clover
Rhizobium meliloti	Alfalfa, white and yellow sweet clovers
Rhizobium phaseoli	Garden beans
Rhizobium leguminosarum	Garden peas and vetch
Rhizobium lupini	Lupines
Rhizobium japonicum	Soy beans

bacteria is made up of innumerable distinct strains of bacteria which vary in efficiency, that is, the ability of the bacteria to beneficially affect the plant to which they are specific (R. 31, Admissions 19 and 20).

Although root nodule bacteria are widely present in nature they are not universally present in all soils and it has become the accepted and desirable practice, in order to insure the presence of a sufficient number of efficient bacteria of the proper species, to inoculate the seeds of the leguminous plants prior to planting with artificial cultures or inoculants. By the use of efficient inoculants, the farmer obtains a substantial increase in the crop yield. Typical increased yields of clover due to artificial inoculation are shown in respondent's Exhibit No. 6 (R. 378).

Commercial Inoculants.—The first step in the preparation of a commercial culture or inoculant is the preparation of so-called stock strains, which may be preserved for long periods of time under properly controlled laboratory conditions. The stock strain comprises a single strain of the desired species of bacteria which has been isolated from nature, identified as to species, and tested for efficiency.*

Once having obtained a satisfactory supply of efficient stock strains, the technical problems involved in the manufacture and sale of reliable commercial inoculants reduce to, first, the necessity of supplying the bacteria to the farmer in a readily usable form for application to the seeds prior to planting, and second, the necessity of insuring that the bacteria are present at the time the product is used in such numbers and in such live and active condition that the plants will be thoroughly inoculated.

* The isolation, selection, and testing of stock strains of bacterial cultures and the preparation of commercial inoculants are fully described in Mr. Bond's testimony (R. 39-48).

In general, the bacteria are incorporated in a suitable base or carrier which will enable the farmer to apply the bacteria to the seeds with a minimum of trouble. The base or carrier must be of a character such that the bacteria will remain alive and active from the time of incorporation in the base until the time of application to the seeds (R. 149). Bacteria, being living organisms, will not remain alive and active in a commercial inoculant indefinitely, and it is the usual practice in the industry to indicate on each package an expiration date beyond which the inoculant should not be used. This expiration date is usually one year from the date of packaging of the product (R. 53).

(a) Single Inoculants.—Prior to the Bond invention it was the general practice in the inoculant industry to manufacture and sell for use by the farmer only so-called single cultures or single inoculants (R. 142 and 147). Each inoculant contained only one species of root nodule bacteria and accordingly could be employed successfully only on the plants of the particular cross-inoculation group corresponding to this species. Thus in order to supply inoculants to an agricultural area wherein the principal crops include clover, alfalfa and soy beans for example, it was necessary for the dealer to maintain a stock of clover inoculant, a separate stock of alfalfa inoculant and a separate stock of soy bean inoculant. Commercial inoculants are packaged in three sizes, *i.e.*, sufficient to inoculate ½ bushel, 1 bushel, or 2½ bushels of seeds. In addition to requiring larger inventories, this practice of supplying single inoculants resulted either in an inadequate supply of inoculants for the farmer toward the end of the planting season or in loss to the dealer and the manufacturer if sub-

stantial stocks of the inoculant were left over at the end of the planting season* (R. 140-141).

(b) Mixed Inoculants.—A mixed or composite inoculant, as distinguished from a single inoculant, contains root nodule bacteria of two or more species and may be used by the farmer to inoculate leguminous crops of more than one cross-inoculation group.

To a layman it would seem, as it did to the early workers in the inoculant art, that the provision of a mixed culture would offer no problems over and above those involved in the provision of a single culture. Certainly the mere step of including one or more additional species of root nodule bacteria in the usual single culture would appear to offer no technical problems. Experience, however, prior to the Bond patent, was directly to the contrary.

As early as 1907 the advantages of mixed cultures were recognized and explained (see Earp-Thomas patent No. 865,965, DX 20, R. 784, lines 6-18, R. 785, lines 57-76). During the ensuing decade various mixed inoculants were advertised for sale accompanied by glowing promises and extravagant claims as to beneficial results, but these products without exception were failures and disappeared from the market.** Strains of bacteria which functioned with high efficiency when used in single cultures, became inefficient when mixed with other species in a mixed culture. The undisputed evidence shows (R. 142) that there were

* Although over-age stock could, under the general practice in the industry, be returned to the manufacturer for a 50% refund, the trouble involved and the loss both to the dealer and to the manufacturer was a major source of annoyance in the industry and the advantages of supplying a mixed culture or inoculant were recognized very early in the history of the art.

** There is not a shred of evidence in this case to show, for example, that the products advertised by the Homewood Nitrogen Company in 1914 (R. 636) or the Alphano Humus Company in 1916 (R. 609) were ever sold or used.

no mixed cultures for field legumes on the market at the time the product of the Bond patent was first introduced to the trade. Prior to the Bond invention mixed inoculants had fallen into disrepute. They were considered impractical and were not offered for sale in competition with single cultures.*

The "Bible" of the inoculant industry (R. 125), published in 1932 and entitled "Root Nodule Bacteria and Leguminous Plants" by Edwin Broun Fred, Ira Lawrence Baldwin and Elizabeth McCoy, University of Wisconsin Studies, states at page 244 (PX 13, R. 398), that "composite cultures offer few advantages and certainly many disadvantages," and at page 254 (R. 401) that "it is desirable to have only the one type of organism in the culture."**

The scientific investigations into the efficiency of mixed cultures and the causes of the failure of mixed cultures to provide the same degree of nitrogen fixation as single cultures all pointed toward the impracticability, or even impossibility, of producing a mixed culture which would have the same ability to promote nitrogen fixation when applied to leguminous plants as would a plurality of single cultures containing the same strains of bacteria. The deficiency of mixed cultures was ascribed to an inhibitive effect

* Mr. Bond testified (R. 137):

"The results obtained with these cultures were very uncertain. Sometimes they didn't even form nodules on the plants for which they were recommended. In other words, the need for a mixed culture was shown in the early history of these mixed cultures but none of them survived on the market, to my knowledge anyway, much after 1930 when there were more intensive culture tests made by the State and the United States Government institutions."

** Petitioner's implication (Br. p. 7) that mixed cultures offered no difficulties beyond those encountered with single cultures is not supported in the record. The quotation from Fred, Baldwin & McCoy, in petitioner's footnote 12, is immediately followed by the recommendation of these eminent scientists that only single cultures be employed.

exerted by the different species of bacteria on each other which reduced the efficiency of the bacteria.* In other words, although the different species of bacteria were found to be capable of living together, they would for some reason not function as well in association with each other as when used alone.

The apparently insurmountable inhibitive effect encountered in mixed cultures was not the only difficulty involved in the preparation of a satisfactory product. It had long been known that the different species of root nodule bacteria were characterized by different rates of growth, some being very fast growers and some being very slow. Accordingly, placing two or more species of root nodule bacteria in a nutrient rich base, as had been suggested and taught in the prior patents and literature,** would result in the faster growing species overgrowing the slower ones to the extent that by the time the product was to be used there would be either a deficiency or a complete absence of the slower growing species of bacteria in the purported mixed culture. Dr. Erdman, one of petitioner's experts, commented on this problem in a report dated June 10, 1938, in which he criticized and undertook to demonstrate the impracticability of the Bond mixed cultures which had just been introduced to the trade by respondent. Thus Erdman

* The most extensive investigation of this inhibitive effect made prior to the Bond invention is found in a report by Max Kronberger of the Bavarian Agricultural Institute for Plant Culture and Plant Protection, Munich, Germany (R. 383-394). See particularly Kronberger's conclusion (R. 394). See also the report of the Department of Agriculture for the Dominion of Canada by Dr. Lockhead (R. 396, last 7 lines).

The Kronberger report is based on experiments which extended over a period of four months, and the Lockhead report is an official publication of the Canadian government. Surely these are not "more or less casual statements" (Petitioner's brief p. 13) and they were neither "refuted or explained" by petitioner's witnesses.

** See Earp-Thomas patent 1,099,121 (R. 786, lines 87-91).

pointed out that reliance on growth of the bacteria after mixing with the base, as had been done in single cultures, would lead to disaster. This comment was made prior to issuance of the Bond patent which teaches the use of a low nutrient base and the initial incorporation of large numbers of each species.*

The Bond Invention.—The inventor, Mr. Bond, when initially assigned the problem of developing and producing a satisfactory mixed culture or inoculant for farmers, conducted an exhaustive survey of the then available literature (R. 54 and 55).

The problem faced by Mr. Bond was two-fold: first, the elimination or correcting of the mutually inhibitive effect, and second, insuring that the final product would contain the proper number of live and active bacteria of each species throughout the intended useful life of the product. The solution of this apparently insoluble problem by Mr. Bond stems from the startling and unheralded discovery that there exist in nature certain strains of each species of root nodule bacteria which do *not* exert a mutually inhibitive effect on each other and that such mutually noninhibitive strains can by proper methods of selection and testing be isolated for use in mixed cultures, and in the conception by Mr. Bond that a final product which would contain

* Erdman said (R. 145):

"Another factor, which might seriously interfere with the efficiency of such a culture is the rate of growth of the different legume bacteria. We believe that **most manufacturers of humus legume inoculants depend upon the increased growth of the legume bacteria after they are mixed with the humus. It would be almost suicidal** to mix a slow growing organism like the soybean bacteria with fast growers like the alfalfa and red clover bacteria. Such a culture if prepared, say in January, would theoretically contain relatively few soybean bacteria when it would be used on soybeans in May or June." (Emphasis ours, throughout unless otherwise noted.)

throughout its expected life a sufficient number of live and active bacteria of each species could be achieved by employing a base material substantially free of nutrients and by initially adding to this base material large numbers of each species of bacteria, the number of each species being of substantially the same order of magnitude (R. 103).

The Disclosure of the Patent in Suit.—The Bond patent sets forth clearly and in meticulous detail the nature and the characteristics of leguminous plants and legume bacteria (R. 773, col. 1, line 5, to col. 2, line 8); the recognized classification of the *Rhizobia* and the legumes into corresponding species and cross-inoculation groups (R. 773, col. 2, line 31, to R. 774, col. 1, line 5); the prior art practices in connection with single cultures (R. 774, col. 1, lines 6 to 69); the general belief in the art as to the undesirability of mixed cultures (R. 774, col. 1, line 70, to col. 2, line 7); and the disadvantages attending upon the use of single cultures (R. 774, col. 2, lines 8 to 33). The patent states the object of the invention to be, among others (R. 774):

> "* * * to provide a mixed culture of *Rhizobia* capable of inoculating the seeds of plants belonging to several cross-inoculation groups and having the **same efficiency** in respect to nitrogen fixation as a culture which contains only a single species of the organism."

A preferred method of preparing humus type cultures is described in complete detail in the patent (R. 774, col. 2, line 67 to R. 776, col. 1, line 24). The principal advantage of this preferred method of preparation lies in its application to mixed cultures, since as the patent points out (R. 776, col. 1, lines 25 to 38), the number of organisms initially incorporated into the humus base may be accurately determined and the final culture is comparatively free of excess nutrients, such as sugar and minerals which are to a large extent retained in the agar or jelly.

The two-fold problem which Mr. Bond overcame and which had baffled the workers in the prior art is set forth in the patent as involving the inhibitory effect between certain strains of the different species of bacteria and the difficulties in the production of the culture wherein the presence of a sufficient number of each species of bacteria is insured (R. 776, col. 1, lines 63 to 71). The magnitude of the inhibitory effect that may be encountered in mixed cultures is emphasized in the patent by reference to actual tests wherein a strain of soy bean bacteria (*Rhizobium japonicum*) was found to produce 34.8% more nitrogen when employed alone on soy bean seeds than when employed on soy bean seeds in the presence of clover bacteria and alfalfa bacteria (*Rhizobium trifolii* and *Rhizobium meliloti*); and wherein a strain of clover bacteria was found to produce 118% more nitrogen when employed alone than when employed in the presence of soy bean bacteria and alfalfa bacteria (R. 776, col. 2, lines 3 to 56).

The prior belief in the art as to the inhibitory effect encountered when different species of root nodule bacteria are mixed together in a common base is referred to in various passages throughout the patent, and the discovery of the existence of noninhibitive strains and the procedure for selecting such noninhibitive strains are clearly delineated (R. 776, col. 2, lines 64 to 68, and 777, col. 1, lines 9 to 35).

The mutually noninhibitive strains discovered by Mr. Bond are for convenience arbitrarily designated in the patent as "alpha" strains (R. 777, col. 1, lines 36-61). A specific test for determining an alpha strain, which clearly indicates the advantages of using only selected alpha strains in mixed cultures, is recited in the patent (R. 778, col. 1, line 25, to col. 2, line 16).

The large number of bacteria of each species initially introduced into the low nutrient base and the proportionate

number of each species preferably employed are emphasized in the specific example given in the patent (R. 777, col. 2, line 33, to R. 778, col. 1, line 15). The culture used as an example in the patent is a three-in-one culture for inoculating clover, alfalfa, and soy bean plants, and the proportions set out are 300 million clover bacteria per cubic centimeter, 300 million alfalfa bacteria per cubic centimeter, and 450 million soy bean bacteria per cubic centimeter. The importance of this aspect of the Bond invention (the low nutrient base and initial introduction of large numbers of bacteria) which eliminates the danger of one species of bacteria overgrowing the others is explained (R. 778, col. 2, line 68, R. 779, col. 1, line 4).

The Controversy Between the Experts as to Nature of Bond's Improvement and the Theory of the Patented Invention.—Petitioner's principal attack upon the validity of respondent's patent was a so-called "law of nature" defense which was predicated upon petitioner's assertion that the theory of the patent was false, which in turn was based upon the testimony of petitioner's experts that they did not believe in the theory of inhibition. The entire premise of petitioner's defense was that inhibitive strains of bacteria either *do not exist* or *are such a rare exception* as to be unimportant in the manufacture of mixed cultures. It followed, contended petitioner, that Bond discovered nothing, "for his alleged discovery is based on a false theory," and that the patent in suit had been procured as the result of deliberate misrepresentations to the Patent Office as to the character of Bond's product, and therefore actually disclosed and claimed no more than a law of nature.

The patentee Bond and respondent's experts, Dr. Umbreit and Dr. Burris, presented testimony directly opposed to that of petitioner's experts, and hence the question whether or not inhibitive and noninhibitive strains exist in

nature, together with its necessary corollary whether the patent in suit merely disclosed and claimed a law of nature as urged by petitioner, was a question of fact to be determined upon a conflict in the testimony and upon the credibility of witnesses.

The trial judge, after seeing and hearing the experts on both sides, agreed with the patentee and with respondent's experts, Dr. Umbreit and Dr. Burris, that the theory of the patent in suit is true, and found from the evidence that Bond had discovered the fact that among the bacteria found widely spread in nature there existed both mutually inhibitive and mutually noninhibitive strains (Finding No. 14, R. 750).

The court below refused to disturb this finding of fact, saying (R. 820):

> "* * * he (the trial judge) made a specific finding that Bond did discover that there exist in nature noninhibitive strains and that these noninhibitive strains may be selected, isolated and combined and still perform satisfactorily their ordinary desirable functions. Upon this finding there was controverted evidence, but our examination of the record is convincing that that supporting the finding is rather conclusive and that there is no justification for us to declare * * * error in making it."

There is abundant support for these concurrent findings. Thus the patent in suit gives actual test results that establish the existence of both the inhibitive strains, which prior workers in the art had found, and the noninhibitive strains, discovered by Mr. Bond (R. 776, col. 2, lines 3-56). Bond testified (R. 73) that the results given in the patent are based on actual tests. In addition to the tests for inhibition reported in his patent, Bond tested twenty-two mixed cultures and he found fourteen cases of inhibition (tests U 2-38, R. 78 and 79; U 3-38, R. 79; and U 1-40, R. 79, 82-83).

Respondent's expert witnesses Dr. Umbreit (R. 340) and Dr. Burris (R. 352) based their scientific opinions, that both inhibitive and noninhibitive strains of root nodule bacteria do exist, on Mr. Bond's extensive tests, on the literature, and on certain of the tests presented by petitioner's experts (R. 340-341; 352-353).

On the other side of the controversy, petitioner's experts testified, either on the basis of inconclusive tests or no tests at all, that they did not believe in inhibition. Each merely asserted a lack of belief in inhibition, and not one of these witnesses commented on or attempted to explain the Bond tests. Mr. Bond was not even asked about his tests on cross-examination, nor was he asked to produce his test data for the inspection of petitioner's experts. Consequently his tests stood uncontradicted.

The trial judge also rejected the testimony of petitioner's experts when he found for the plaintiff on the "issue of 'unclean hands'" (R. 744) and entered a finding of fact (No. 19, R. 751) to the effect that prior to Bond's invention "substantial portions of the available literature indicated that mixed cultures for field legumes were generally unsatisfactory and that different strains or species of * * * bacteria exhibited an inhibitory effect on each other when mixed in a common base," that Bond believed in the "existence of this inhibitory effect" and had acted in "good faith when he stated in his application that it had been considered impractical to prepare a composite culture inoculant * * * because it was generally believed that one species produced an inhibitory effect on another * * * whereby symbiotic fixation * * * was inhibited or even prevented."

The court below expressly considered petitioner's renewed contention that the patentee had misrepresented his improvement to the Patent Office; it re-examined the evi-

dence and concurring in the foregoing finding of fact, said (R. 825):

> "* * * We find nothing in the record to justify us in ignoring or declaring erroneous this specific finding of the District Court."

The Mixed Inoculants Defined by the Claims of the Bond Patent Are New.—Although petitioner disclaims (Br. p. 4, footnote 4) any intent to urge "anticipation by reason of the prior art," petitioner discusses at length (Br. pp. 4 to 8) the testimony and evidence which were adduced by petitioner to show anticipation and which, after being "studiously examined," were rejected by the court below (R. 824). Petitioner's equivocal contention that the mixed culture of the Bond patent (although anticipation is not urged) is not new forms the basis of its "law of nature" arguments (Points I, II, and III, Br. pp. 19-38), and consequently we deem it advisable to emphasize some of the factors which led to a rejection of petitioner's evidence, when holding that nothing "in the art suggests the slightest conception of Bond's solution of the problem", the court below said (R. 824):

> "* * * the sum total of all of the prior teaching is that mixed inoculants had been in existence before but that they had been composed by hit and run methods without regard to whether the various species included in the composite worked adversely to one another or inhibited one another in their respective growths."

There are two distinct types of tests that are commonly made in the production and control of bacterial inoculants. The *first* is the nodulation test, in which the plants are permitted to grow for a limited period only (3 to 5 weeks) and the number of root nodules observed. This test, which is also sometimes called a vegetative test, may, if the plants are grown for a somewhat longer period, provide an *indication* as to whether the bacteria are effecting stimula-

tion of the plants, but *it does not measure the efficiency of the bacteria.* It determines only that bacteria of the proper species are present (Admission 18, R. 31; Erdman, R. 231-232; Leonard, R. 298; Bond, R. 45). This is the type of test that is used by the United States Department of Agriculture (R. 298) and by various state experiment stations, including New Jersey (DX 19, R. 622, Manns, R. 269) and New York (DX 30, R. 677-678; Hofer, R. 332-333).

The *second* type of test is the efficiency test, or test for nitrogen fixation. These tests consume more time, effort, and care than nodulation tests, and are therefore less commonly used. Three methods may be employed: (a) visual observation of growth and color; (b) dry weight of harvested plants; (c) chemical analysis of dried plants for actual nitrogen content. Method (a) (visual observation) cannot be depended upon (Bond, R. 112; Burris, R. 346); method (b) (dry weights) is sufficiently accurate for most purposes; and method (c) (chemical analysis) is the only scientifically accurate test (Admission 21, R. 31).*

The most that Dr. Manns could have established in his tests (Petitioner's Br. p. 6) is that a plurality of different species of root nodule bacteria will *live and grow* together for a short time in a proper *compost or fertilizer.* Dr. Manns made no tests for nitrogen fixation (either dry weight or chemical analysis) and no tests to compare his mixed culture with single cultures using the same strains. He merely observed the roots of the plants to see whether nodules were formed (R. 254). The "strong inoculation" referred to in Dr. Manns' report (Petitioner's footnote 9) refers only to the size and number of the nodules, and the record establishes (Admission No. 18, R. 31) that "The

* Petitioner is in error (Br. p. 14) when it asserts that respondent "vigorously attacked" dry weight tests—it is only the visual inspection tests that respondent criticizes as being basically inconclusive.

size and number of the root nodules formed on the roots of leguminous plants cannot be considered a measure of the amount of nitrogen fixed." Clearly Dr. Manns' report did not advance the art or contribute any teaching useful in the production of satisfactory mixed cultures.

Petitioner ignores the distinction between mixed inoculants for field seeds employed by farmers and the so-called garden cultures which respondent concedes were sold prior to the Bond patent. These garden cultures, prepared in small packages for sale to home gardeners, usually contained a mixture of three or four different species of root nodule bacteria, so that the home gardener could use the contents of the package interchangeably on beans, peas, sweet pea flowers, or lupine flowers according to his desires (DX 3A, R. 44). These small packages, selling for 10 cents or 20 cents, were advertised for use on 5 to 12 lbs. of seed but were usually employed to inoculate the few ounces of seed contained in the standard 10-cent size package of garden seeds, and the relative efficiency of the mixed garden culture was of negligible importance.

Plaintiff's Exhibit 10 (R. 382) demonstrates the importance of inhibition in mixed cultures for field seeds, but in home gardens the production of a few more peas or beans or a few more flowers is of no particular importance, and the use of any culture, regardless of its efficiency, serves to increase the yield over that obtained when no culture is used. So far as this record shows, no one was ever sufficiently interested in the efficiency of garden cultures to test them further than to ascertain whether sufficient bacteria were present in the culture to form nodules on the plant roots. Fred, Baldwin, and McCoy, in criticizing mixed cultures (R. 398), said with respect to garden cultures (R. 398-399):

> "* * * Perhaps the only justification for this mixing of strains is in the case of the small-size garden culture

> Because of the limited amount of seed to be sown, it may be desirable to have one culture containing the organisms for such crops as beans and peas and thus to reduce the cost of inoculation."

Matchette, in his letter criticizing the mixed cultures of the Bond patent, states that such cultures had never proven successful, and draws a distinction as to garden cultures (R. 143).

The record in the case at bar shows only, and respondent concedes, that garden cultures containing more than one species of Rhizobium were sold prior to the Bond patent. It is abundantly clear, however, that these garden cultures were not and are not the mixed cultures defined in the claims of the Bond patent, and petitioner's assertions to the contrary are unavailing.

Petitioner's comparison (Br. p. 7) of the alleged method practiced in 1937 by McQueen's in making garden cultures is based solely on the *uncorroborated recollection testimony of Curie*, whom the court below characterized as an "interested witness," whose testimony, even as to more recent events, was found to be "not the most convincing," and whose views as to inhibition were declared "erroneous" (Opinion, R. 830).

Petitioner completely failed to prove its garden culture defense with the particularity required by the authorities, and it was rejected by the court below.

THE OPINION OF THE COURT BELOW.

The Circuit Court of Appeals rested its opinion upholding the validity of respondent's patent upon the well-established patent law principle that patentable invention results from the application of a discovery of a principle or law of nature to a special purpose so as thereby to effectuate a practical result and benefit not previously attained.

It thought that this principle was controlling, as it was peculiarly apposite to the facts as found by both courts below, which were to the effect that the patentee had discovered that there exist in nature noninhibitive strains of bacteria and that these noninhibitive strains may be selected, isolated and combined in a carrier and still perform satisfactorily their ordinary desirable functions in a composite commercial inoculant which had not been previously achieved and of which the public now has the benefit (Finding No. 19, R. 749, C. C. A. Op. R. 820-824).

Without elaboration of his reasons, the District Court had simply held that the Bond patent claims were invalid because they did not involve the invention or discovery of any new and useful art, machine, manufacture or composition of matter. He reached this conclusion with "reluctance," as he was impressed with the "very great diligence" and "ingenuity" of the patentee and "with the results he obtained" (R. 744). The Court of Appeals was constrained on the basis of the District Court's findings of fact and its own reexamination of the evidence to reverse this conclusion of invalidity. In view of the District Court's specific findings that Bond had discovered that there are noninhibitive strains of bacteria as well as inhibitive strains, and that Bond had been greatly diligent and ingenious, the court below thought that it became obvious that Bond had "made an inventive step forward in the art of production and commercial distribution of composite inoculants."

The Court of Appeals found the mistake of the District Court to rest in the conclusion that Bond's work did not amount to patentable invention within the meaning of the statute. In arriving at this conclusion the court below relied not only upon the trial judge's specific finding but upon its own painstaking review of the evidence which

showed: (1) that there had long been a demand "that farmers should have one composite inoculant" instead of being required to "buy, preserve and maintain several different inoculants," (2) that Bond's problem was to find a product in which "he might get away from the inhibitive antagonistic impeding characteristics of the different strains of bacteria" which when combined had rendered prior composite inoculants unsatisfactory and at the same time "produce a composite that would contain and maintain the proper number of live and active bacteria of each species throughout the useful life of the product," (3) that this problem "had not been solved by any one" prior to Bond, (4) that Bond's "scientific investigation led to a proper solution" which the evidence showed had "baffled the workers in the prior art because of their mistaken assumption of supposedly universal inhibitive effect encountered in mixed cultures," and (5) that Bond by "discovering that there are noninhibitive bacteria" had taught the art to avoid inhibitive effect as being "the restraining factor preventing a successful commercial composite inoculant" and had also taught that noninhibitive bacteria can be "successfully employed, when combined, without injury to any of the other constituent species."

The three judges of the Court of Appeals also pointed out that—whereas the District Court, despite his recognition of the value of Bond's work, thought that Bond had "merely discovered a law of nature,"—the evidence clearly showed, in their judgment, that what Bond had discovered was that "certain existing bacteria do not possess the mutually inhibitive characteristics which had previously prevented a successful commercial composite inoculant and that those uninhibitive species may be successfully combined." It was this contribution of "noninhibitive strains which successfully combine" which the three judges

of the court below believed "brought about a new patentable composition," since, as they deemed clear from the evidence, Bond had applied "scientific knowledge to things existing in nature" and utilized them "in a desirable composite product which had not been previously achieved but which he did achieve and of which the public now has the benefit."

It cannot be said that the court below intended, by its decision, to depart from the established principles of the patent law. Quite the contrary, in reaching the conclusion that the patentee's work came within the "decisive definitions of invention," reliance was placed upon, *inter alia*, this Court's decision in *Mackay Radio & Tel. Co.* v. *Radio Corp.*, 306 U. S. 86, and its own prior decision in *Dennis et al.* v. *Pitner et al.*, (C. C. A. 7) 106 F. (2d) 142. It was the view of the court below that its ruling was in accord with the doctrine of these cases because Bond's disclosure of a "successful composition of noninhibitive strains in combination of elements in one inoculant operating successfully on several different groups of legumes" established that:

> "* * * he did much more than discover a law of nature. He made a new and different composition, one contributing utility and economy to the manufacture and distribution of commercial inoculants."

Petitioner also insisted in the court below, as it indirectly urges here (Br. pp. 27-28), that the patent claims in suit do not relate to a true patentable composition of matter or combination, and that instead they are aggregative in character, covering a mixture of independent substances as found in nature, which do not lose their identity or coact to achieve a result. The major foundation of this contention was disposed of by the court below when it rejected petitioner's "law of nature" arguments. But the

court did not stop there. It also held that Bond's teaching of how to make a composite inoculant, successful, efficient and filling the need it was meant to fill, was not "aggregation," but on the contrary "inventive conception," the existence of which makes co-action unessential (R. 827). Admitting that a composite inoculant had been "thought of," the court below pointed out that just as truly it had not achieved approved recognition, and indeed was considered by scientists "a dangerous practice." The court thus concluded on this aspect of the case that because Bond had made an unusual selection, had overcome a "hitherto unsolved problem", and had exercised the inventive faculty, patentable invention of a composite inoculant had been achieved.

In overruling petitioner's argument that the "description of the patent is insufficient, under 35 U. S. C. A. 33, which requires inventors to describe clearly their inventions," the court below by clear implication also ruled that the doctrine of *Halliburton Co.* v. *Walker*, 329 U. S. 1 which had been relied on by petitioner was not offended by the claims in suit. In reaching the conclusion that there is nothing in the record to justify invalidating the patent on this score, the court below emphasized these factors:-(1) the tests to be employed in the selection of the proper bacterial strains were conventional and well known to bacteriologists, (2) noninhibitive strains are not readily identifiable in nature as separate species, (3) there is no weight and measure method by which a bacteriologist may determine the quality or quantity of his bacteria, (4) the only available method is selection by utilization of well known tests, and (5) only a scientist in his laboratory can produce controlled cultures and must at all times employ methods found efficient by trained scientists. The court consequently ruled that, as the character and limitation of

the tests prescribed by Bond were well known to the art, intelligent bacteriologists setting out properly to gather the enumerated ingredients of the composite article "could hardly go astray" on reading the description.

SUMMARY OF ARGUMENT.

It is revealed preliminarily that petitioner's discussion of that which is presented as a legal question, *i.e.*, the "law of nature" issue, is interspersed with, and bottomed entirely on, assertions of fact which are either (a) based upon testimony and evidence rejected by the courts below, or (b) inconsistent with petitioner's concession of no "anticipation by reason of prior art." Petitioner is really attempting to secure a retrial of the facts and have this Court redetermine fact questions which the courts below decided against petitioner. This Court has repeatedly held, under a settled rule, that it will not overturn concurrent findings where there is evidence to support them; and quite apart from the petitioner's concession of *no anticipation*, petitioner cannot persuasively construe the prior art evidence as it does because petitioner has wholly failed to make the clear and convincing proof which the authorities require.

I.

The facts being otherwise than as assumed and asserted by petitioner, it is quite plain that the court below did not improperly apply the law to the facts. A review of the leading decisions shows that as early as *LeRoy et al.* v. *Tatham et al.*, 55 U. S. 156, it was established that while a principle or law of nature is *per se* unpatentable, patentable invention may be achieved by the practical application of a discovery of a "new property" in matter in the "construction of a useful article of commerce or manufacture" or by

application of a discovery "to any special purpose so as thereby to effectuate a practical result and benefit not previously attained." The general rule relied on by petitioner is thus subject to an important *patentable* exception—one which entitles an inventor to patent protection for putting a natural force or agency into a specified condition and then using that force or agency in that condition for the achievement of a new and useful improvement. It was this well-settled principle of the patent law which the court below found peculiarly apposite and, therefore, controlling in the special facts of this case.

A. The Bond product is new and useful and has the quality of invention. (1) The finding of the court below that the Bond product is "new and different" is fortified by petitioner's concession of *no anticipation*, which fully implies that prior to Bond's patent there was no mixed inoculant like, or substantially like, Bond's. (2) Usefulness within the meaning of the statute is not seriously denied, and, in any event, is covered by concurrent findings which are clearly supported by the evidence. (3) That the Bond product resulted from the exercise of *invention*, thus meeting the third statutory prerequisite, is abundantly shown by the evidence. All of the criteria of invention are found in the record here. The advantages and desirability of a mixed culture for field seeds were recognized as early as 1907. Others had tried and failed to produce such culture, so that when Bond entered the field, there were no commercial mixed inoculants for field seeds on the market, and those skilled in this art condemned them as unsuccessful or "dangerous practice." Bond disabused the art of a misconception which was the very foundation of a thirty-year failure, and took the last step which turned failure into success. The trial court found that Bond was diligent and ingenious, and the court below found that he had taken

an inventive step forward in the art and that his teachings amounted to inventive conception. These findings of fact are not erroneous; they are supported abundantly by the evidence.

B. The statutory conditions of novelty, utility, and invention being met, the patentable application of a discovery of a law of nature is not dependent upon modification or change of the natural force or agency; neither is it dependent on a use of the agency in a manner or for a function that is not accomplished in nature. An examination of the decisions relied on by petitioner reveals no support whatever for petitioner's contention that patentable invention was not achieved by Bond because he did not change the bacteria or use them for a function foreign to their natural function. As man is incapable of changing the immutable laws of nature, all that is necessary is that a natural agency be placed in a specified condition and used in that condition for a practical purpose. This is precisely what Bond did in the case at bar.

C. The inoculant disclosed in the Bond patent is properly classifiable as a "composition of matter" within the meaning of the patent statute (R. S. § 4886, 35 U. S. C. § 31). The words of the statute cover all compositions of two or more substances. They include all composite articles whether they result from chemical or mechanical mixture. Bond's inoculant meets all the tests for determining true compositions. It is a combination of different elements which, by reason of a *negative* interrelationship in a whole complex, utilized as a unit, achieves a new and characteristic result. For every practical purpose it is a new thing, yielding something to the useful arts. Where the inventive step lies in the provision of a *negative* rather than a *positive* condition, and where, indeed, this was the desideratum itself, it is both illogical and absurd to contend

as does petitioner, that a true composition was not achieved merely because of the absence of positive interaction or because the elements do not lose their identity.

D. The *Vitamin Technologists* case (C. C. A. 9), 146 F. (2d) 941, is not parallel to the facts in this case. In that case, earlier scientists had succeeded, prior to Steenbock's patent, in producing antirachitic activation by application of ultraviolet rays to various substances, and Steenbock being familiar with this work, merely determined the scientific principles involved. Bond, on the other hand, did not merely determine the reasons for successful use of prior mixed inoculants, for there were no such inoculants either described or used. The *Vitamin* case expressly recognizes the rule of law which was applied by the court below. The different results in the cases are attributable to different facts. Steenbock's process was found to be anticipated, whereas here petitioner does not even urge anticipation of Bond's product. The contention that the unsuccessful prior mixed inoculants would, if used today, infringe Bond's patent must be repelled because petitioner has wholly failed to prove that the prior mixtures contained noninhibitive strains, and therefore, cannot be heard to say that Bond merely recognized a scientific truth employed by earlier workers.

II.

Patent claims that define a new bacteriological product distinctly and exactly in the only language available to the art fully meet the requirements of the patent statute (R. S. § 4888, 35 U. S. C. § 33) that a patentee "particularly point out and distinctly claim" the improvement which he claims as his invention or discovery. Thus, since bacterial life is customarily described by its physiological characteristics, *i.e.*, what it will do, Bond's claims which so describe the

bacteria are not invalid as being functional under the doctrine of *Halliburton Co.* v. *Walker*, 329 U. S. 1. The vice of the claims which this Court has condemned under the statute in that case and in others lies not in mere use of functional language, but rather in the failure of the claims to depict the invention with specificity and in the consequent extension of the monopoly beyond the real invention. In *General Electric Co.* v. *Wabash Appliance Corp.*, 304 U. S. 364, it was expressly recognized that functional language *per se* is not proscribed by the statute. Where, as here, when dealing with bacterial life, physiological description rather than physical description is the tool of the art, it should not be held that use of the tools of the art, even though of a functional character, is violative of the statute. No criticism of the Bond disclosure was voiced by any expert witness. No one had any difficulty in reading the patent and understanding the nature of the Bond product as described and claimed by means of the physiological characteristics of the bacteria.

III.

Public importance is not a ground for invalidating an otherwise valid patent. Where the statutory conditions of patentability prescribed by Congress have been fulfilled, no court may disregard such compliance and deprive the patent owner of the benefits sanctioned by the Constitution on the ground that it is unwise or prejudicial to the interests of the public. *Hartford-Empire Co.* v. *United States*, 323 U. S. 386, 432.

ARGUMENT.

INTRODUCTION.

Although petitioner purports to present as the principal issue in this case the question whether there has been a proper application of the law to the facts, its arguments plainly show that petitioner's real position is that the error committed by the court below was one of fact and not of law.

Petitioner thus begs its own issue when it obscures and confuses the question actually presented by incorporating in its discussions of legal points, assumptions or statements to the effect:

(a) that the theory of the Bond patent is false—that inhibitive strains do not exist (Pet. Br. pp. 9, 13, 14, 15 and 20); and

(b) that mixed inoculants producing the same function and achieving the same result as Bond's patented inoculant were old and well known—that Bond did not create a composition of matter which had never existed (Pet. Br. pp. 22, 23, 25, 29, 30, 31, 33 and 35).

Only by assuming and relying upon such premises as (a) and (b) has petitioner succeeded in imparting any plausibility whatever to otherwise untenable arguments.

But the courts below have concurrently found the fact to be that Bond discovered, contrary to universal belief, that there exist in nature noninhibitive strains of legume bacteria and petitioner concedes that there is no anticipation by prior art. Thus in making its arguments petitioner is (a) pressing upon this Court the evidence of petitioner's experts that the Bond theory is false, which

was twice rejected by the courts below, and (b) urging points and construing the evidence as to prior art uses and patents in a manner wholly inconsistent with the concession of no anticipation. Petitioner is really seeking a retrial of the facts. It is manifest also that petitioner would have this Court overturn concurrent findings below and redetermine the fact-questions of anticipation, utility, and inventiveness.

(a) In the finding of fact that Bond discovered the existence of noninhibitive strains, it is implicit that an important discovery which in turn made possible the production for the benefit of the public of a patentably and commercially new product was made by Bond. From this finding inescapably follows the conclusion that petitioner is in error when it argues that Bond discovered nothing and exercised only the skill of the calling, or that there was no problem solved by Bond, or that the Patent Office should not have granted the Bond patent, or that Bond's inoculant is no more than a product found in nature, or that the bacteria of Bond's inoculant produce the same and well-known function of an old and well-known product.

These aspects of petitioner's argument thus turn essentially on questions of fact decided adversely to petitioner. But petitioner has not demonstrated that the concurrent finding is clearly erroneous; it is content merely to assert on the basis of its experts' rejected testimony that Bond's theory is false. This Court has repeatedly held under a settled rule that it will not overturn concurrent findings where there is evidence to support them, *Williams Co.* v. *Shoe Machinery Co.*, 316 U. S. 364, 367; *Continental Paper Bag Co.* v. *Eastern Paper Bag Co.*, 210 U. S. 405, 416, 422; *Adamson* v. *Gilliland*, 242 U. S. 350, or that it must be a strong case before this Court will do so, *Goodyear Co.* v. *Ray-O-Vac Co.*, 321 U. S. 275, 278. See also *Battin*

v. *Taggert*, 17 How. 74, 85; *Bischoff* v. *Wethered*, 9 Wall. 812, 814; *Thomson Spot Welder Co.* v. *Ford Motor Co.*, 265 U. S. 445; *Stilz* v. *United States*, 269 U. S. 144, 147.

(b) It is implicit in petitioner's concession of no anticipation by prior art that if, as the court below expressly found, the Bond mixed inoculant is new and different, which means that it is not foreshadowed by any prior art patent, publication or use, then it is not true, as petitioner despite its concession continues to assert, that (1) the bacteria work in Bond's inoculant as they worked in previous unsuccessful mixed inoculants, (2) Bond's inoculant differs from the old mixed inoculant only in degree, (3) the Bond product produces the "same and well known function" of an old and well-known product, or (4) the Bond product is the same as the prior mixed garden culture.

Irrespective of its concession, petitioner cannot persuasively urge these points in this Court because petitioner wholly failed to make the clear and convincing proof of the prior art practices and uses on which it relies, which under well-settled rules it was required to make. *Radio Corp. of America* v. *Radio Engineering Lab., Inc.*, 293 U. S. 1, 8; *The Barbed Wire Patent*, 143 U. S. 275, 284; *Loom Co.* v. *Higgins*, 105 U. S. 580, 581; *Eibel Co.* v. *Paper Co.*, 261 U. S. 45. It is well-settled that proof of prior uses must be made with reasonable clearness, and the burden of proof being upon the infringer, every reasonable doubt will be resolved against him.

The evidence clearly shows, contrary to petitioner's assertions, that the patents, publications and uses from which petitioner draws some of the assumptions which are interspersed in the discussion of the legal point, do not justify such assumptions. The evidence reveals that mixed field cultures, although previously proposed, had not

been satisfactory and had disappeared from the market, and that workers in the art had neither appreciated nor solved the problems which Bond overcame in transforming mixed cultures from general disrepute to general acceptance. This record contains a long parade of failures from and after 1907 in the attempts to place a field seed mixed culture upon the market, and this is true notwithstanding that sufficient knowledge was apparently possessed with which to prepare single cultures for field seeds, as well as with which to prepare the garden seed variety mixed culture.

Garden cultures were and are satisfactory for their intended purpose regardless of the question of inhibition, because of the different economic problems involved (*ante*, pp. 20-21). But no conclusions unfavorable to the Bond product may be drawn from the use of the garden type of mixed culture. The failure of those working in the field seed art, reinforced by their knowledge of mixed garden cultures, to adapt single field seed cultures to the preparation and use of a mixed field seed culture, indicates conclusively that the adaptation was not obvious and that it involved more than mechanical skill. It demonstrates, also, that there is a signal difference *in kind* between a mixed culture for field seeds and either the single culture or the garden variety mixture. Granting that single cultures and mixed cultures of the garden variety type had long been known, it is nonetheless clear on this record that a *different problem* was involved in the production of a field seed mixture. A most intimate familiarity, experience, and working knowledge with and of single cultures and garden mixtures had significantly failed to reveal the secret of the ways and means of producing a mixed culture for field seeds such as clover, alfalfa, soy beans, etc.

There is not one iota of proof as to the use of non-inhi-

bitive strains in garden cultures prior to the Bond invention, nor is there sufficient proof to establish that these cultures contained the various species of bacteria in numbers of substantially the same order of magnitude, or that the base employed was substantially free of bacterial nutrient. Not a single witness called by defendant even purported to have made nitrogen fixation tests for the purpose of determining whether the prior garden cultures contained noninhibitive strains.

Curie is the only witness who claimed to have made any comparative tests between single cultures and mixed garden cultures utilizing the same strains of bacteria, and his purported tests were merely greenhouse or visual tests which Dr. Erdman agrees do not constitute a scientific way of determining nitrogen fixation (R. 231-232). Likewise, Curie is the only witness who purported to know anything about the relative number of each species of bacteria in these prior garden cultures or the amount of nutrient in the base. Curie is an interested, unconvincing witness (*ante*, p. 21). His testimony was entirely from recollection of tests and processes purported to have been carried on many years prior to the date of his testimony. He failed to produce a single test report or a single written document to corroborate his recollection (R. 206-207).

Petitioner consequently is entirely unjustified in drawing any inferences from the garden mixed cultures, for it failed to prove their characteristics and properties clearly and convincingly. Mere oral testimony for this purpose is insufficient. *Eibel Co.* v. *Paper Co.*, 261 U. S. 45, 60.

From the foregoing, it is clear that there is no factual basis for petitioner's highly technical "law of nature" arguments. The facts are that Bond made an important discovery and then proceeded to apply and utilize his dis-

covery in the production of a new, different, highly useful and efficient mixed inoculant which had not been previously achieved but which Bond did achieve and of which the public now has the benefit.

We accordingly now show that under well settled principles of the patent law this amounted to patentable invention; and that no improper application of the law was made by the court below to the facts as found in this case.

I.

THE BOND PATENT IN SUIT DOES NOT MERELY DISCLOSE AND CLAIM THE DISCOVERY OF A LAW OF NATURE.

The status of a principle or a "law of nature" under the patent law was first thoroughly discussed and debated in the opinions of this Court in *LeRoy et al.* v. *Tatham et al.*, 55 U. S. 156, and *O'Reilly et al.* v. *Morse et al.*, 56 U. S. 62. As appears from the learned dissertations of the justices, and especially the vigorous dissents of Justices Nelson (55 U. S. 177 *et seq.*) and Grier (56 U. S. 129 *et seq.*), the word "principle" was employed synonymously with the idea more or less of some natural physical force, power or energy, and together these decisions established the doctrine that a principle in this sense, or a function or a result, may not be the subject of a patent. No proposition has been more frequently or positively stated by this and the lower federal courts since 1852 than that a principle or law of nature is not a patentable invention, and yet with equal frequency and positiveness this Court and the others have fully implemented the exception to the general rule, also established by *LeRoy et al.* v. *Tatham et al.*, which was to the effect that *application* of a principle or law of nature in a useful article of commerce is patentable.

In *LeRoy* v. *Tatham*, after observing that a principle cannot be patented, this Court stated (55 U. S. 175) that invention lies not in discovering natural agencies, but "in applying them to useful objects," and added that a "new property discovered in matter, when practically applied, in the construction of a useful article of commerce or manufacture is patentable." The following quotation from *Household Company* v. *Neilson*, Webster's Patent Cases, 683, was also approvingly made:

> "**A patent will be good**, though the subject of the patent consists in the discovery of a great, general, and most comprehensive principle in science or law of nature, **if that principle is by the specification applied to any special purpose so as thereby to effectuate a practical result and benefit not previously attained.**" *

Shortly afterward, in *Wintermute* v. *Redington* (C. C. Ohio, 1856), 1 Fish. Pat. Cas. 239, 30 Fed. Cas. 367, Judge Wilson succinctly and properly explained the general rule and its exception thus:

> "It is true that a patent can not be sustained for a mere principle. For instance, Sir Isaac Newton's discovery of the principle of gravitation could not be the subject of a patent. But it is equally true, that a principle may be embodied and applied, so as to afford some result of practical utility in the arts and manufactures, and that under such circumstances a prin-

* The patent of the Tathams was not invalidated in this case. The verdict of a jury in favor of the patent was set aside because of error in the charge (55 U. S. 177). The case was retried in chancery, and upon appeal from a decree upholding the patent, this Court affirmed (63 U. S. 132), saying (p. 137):

> "The 'newly-discovered property in the metal, and the practical adaptation of it, by these means, to the production of a new result, namely, the manufacture of wrought pipe out of solid lead,' was the discovery. 'There can be no patent for a principle; but for a principle so far embodied and connected with corporeal substances as to be in a condition to act and to produce effects in any trade, mystery, or manual occupation, there may be a patent.'"

ciple may be the subject of a patent. It is, however, the embodiment and the application of the principle which constitute the grant of the patent. And it has been justly said 'that the principle so embodied and applied, and the principle of such embodiment and application are essentially distinct; the former being a truth of exact science, or a law of natural science, or a rule of practice; the latter a practice founded upon such truth, law, or rule.' ''

A reaffirmation of the doctrine was made by this Court in *Sewall* v. *Jones*, 91 U. S. 171, where it was said (p. 184):

> "When a party has invented some mode of carrying into effect a law of natural science or a rule of practice, it is the application of that law or rule which constitutes the peculiar feature of the invention. He is entitled to protect himself from all other modes of making the same application."

The decision of this Court in the *Telephone* cases, 126 U. S. 1, forcibly illustrates the decided *and patentable* difference between (1) merely describing and claiming the discovery of a natural agency or law, and (2) describing and claiming either a machine, process, manufacture or composition of matter in which a natural agency is applied for a practical and useful purpose. That decision clearly reaffirms the exception to the general rule and holds that one who puts a force of nature into a certain specified condition and then uses it in that condition for a practical purpose is entitled to patent protection. Thus, it was stated by Chief Justice Waite (126 U. S. 534):

> "In the present case the claim is not for the use of a current of electricity in its natural state as it comes from the battery, **but for putting a continuous current in a closed circuit into a certain specified condition suited to the transmission of vocal and other sounds, and using it in that condition for that purpose.** So far as at present known, without this peculiar change in its condition it will not serve as a medium for the

transmission of speech, but with the change it will. Bell was the first to discover this fact, and how to put such a current in such a condition, and what he claims is its use in that condition for that purpose, just as Morse claimed his current in his condition for his purpose."

Another apt illustration of the patentable exception is found in *Cameron Septic Tank Co.* v. *Village of Saratoga Springs* (C. C. A. 2), 159 Fed. 453. In that case the patented process related to securing the separate and successive action of anaerobes and aerobes on the organic matter of the solids in a flowing current of sewage by secluding it before its passage into the aerating tanks in a septic tank where it was excluded from light, air, and agitation until by the anaerobic action generated therein all organic matter was dissolved and the entire current liquefied. Rejecting the defense that the process claims were void because they covered "a process of nature and one which cannot be covered by any one," the court said:

"* * * We, however, are satisfied that Cameron was the first one to subject a flowing current of sewage to the action of anaerobes and aerobes under conditions which secured their separate and successive action, the action of the segregated anaerobes fitting the effluent for subsequent filtration and aerobic action; and by reason of such careful segregation he was the first to secure such specified condition in the anaerobic colony that its capacity for its natural work was increased to such an extent that it became capable of disposing of practically all future inflowing sewage that entered its workshop without accumulating such a deposit of sludge as would require removal. This certainly involved 'the use of one of the agencies of nature for a practical purpose.' *Risdon Locomotive Works* v. *Medart*, 158 U. S. 77, 15 Sup. Ct. 745, 39 L. Ed. 899. **The process is one which puts a force of nature into a certain specified condition and then uses it in that condition for a practical purpose.** *Bell Tele-*

phone, 126 U. S. 1, 534, 8 Sup. Ct. 778, 31 L. Ed. 863. Within the principles enunciated in the two cases last cited, we are satisfied that Cameron's process as set forth in these five process claims is patentable."

Of the bacteria involved in the *Cameron* case, the anaerobes are micro-organisms that are killed by air; they can neither act, multiply, nor even exist in contact with free oxygen; and the aerobes are micro-organisms that die without air or oxygen. That both germs were potent in breaking up the solid parts of sewage matter was a fact long known to those skilled in the art. The significance of the *Cameron* case lies in the fact that the court upheld as patentable a new and useful process which consisted merely in carefully segregating the bacterial families and taking advantage of their respective natural capacities.

The patentable exception which is the core of the opinion of the court below was recently emphasized by this court in *Mackay Radio & Tel. Co.* v. *Radio Corp.*, 306 U. S. 86, 94, where it was said:

> "While a scientific truth, or the mathematical expression of it, is not patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be."*

From the foregoing it is perfectly apparent that the highly technical "law of nature" defense may be sustained only when the claim is to the discovery of a natural agency or force *without more*. Also, that if the discovery has been applied or utilized in a corporeal composition, article or apparatus, for a practical purpose and to achieve a

* In that case, this Court assumed that Carter's advance was invention, even though it was achieved by the logical application of a known scientific law to a familiar type of antenna. And see also *Katz* v. *Horni Signal Mfg. Corp.* (C. C. A. 2), 145 F. (2d) 961 (Cert. denied 324 U. S. 882), where the Circuit Court of Appeals upheld a patent which made "a highly useful application of one of Faraday's discoveries."

result not previously attained, patentable invention may exist. This patentable difference has never been ignored by this or any other court. Many of the most important inventions have necessarily made use of a natural agency for a practical purpose. Again and again valuable contributions to the advancement of the arts and sciences have been made by simply putting a natural agency into a specified condition and using that agency in that condition for a practical purpose.

The court below had no quarrel with the well-established principle that a patent cannot be sustained for the discovery of a law of nature. The opinion below evidences no disposition whatever to modify or qualify either the rule or any of its clear implications. Patentability was upheld here because, as the court below found, the patentee applied and utilized a law of nature in a manner previously regarded as "dangerous practice," thereby to produce a commercial inoculant "successful, efficient and filling the need it was meant to fill." Thus the court below expressly held that the patentee "did much more than discover a law of nature. He made a new and different composition, one contributing utility and economy to the manufacture and distribution of commercial inoculants." The inoculant described and claimed by the patentee was held to be a "new patentable composition" because he had applied "scientific knowledge to things existing in nature" and had utilized them "in a desirable composite product which had not been previously achieved but which he did achieve and of which the public now has the benefit."*

It should therefore be quite obvious that since the facts

* Thus clearly the court below has found the three statutory prerequisites—novelty, utility, and invention—to exist (see *post* pp. 43-48). It is absurd to contend, as does petitioner (Br. p. 32), that the court below "would avoid the requirement of the patent statute."

are otherwise than assumed and asserted by the petitioner, the court below did not improperly apply to the actual facts a well recognized patent law principle.

Moreover, petitioner's arguments (Br. p. 21) as to the consequences of an affirmance of the court below are wholly beside the point and are, in addition, erroneous. If the Bond patent is sustained, as it should be, it will not "stop all further progress" in the inoculant art; it will instead stimulate research to find other and better ways to effect inoculation. There is no reason why manufacturers other than respondent should feel free to make mixed cultures without "fear of infringing the Bond patent." Prior to Bond they not only did not know how to do so successfully, but regarded it as *a dangerous practice.*

The Bond patent does not "monopolize an entire industry," since mixed cultures for field use constitute only a minor part of the business as compared to single cultures and are not even sold by some of the largest manufacturers (R. 237). In an attempt to magnify the "far-reaching effect" of the Bond patent, petitioner overemphasizes the use of "mixed seedings"—Bond considered this "a minor point so far as the advantages of composite cultures are concerned" (R. 98-99).

Petitioner also apparently contends (a) that Bond's product does not possess the statutory prerequisites of patentability; (b) that a patentable application of Bond's discovery of a law of nature was legally impossible because Bond did not change or modify the natural characteristics of the bacteria and did not add or take anything away from them; (c) that Bond's mixed inoculant is not classifiable subject matter under the statute and it is not a true composition of matter; and (d) that the decision in *Vitamin Technologists, Inc.* v. *Wisconsin Alumni Research Foundation* (C. C. A. 9), 146 F. (2d) 941, is an authority

requiring a holding of invalidity of the Bond patent. We now consider these untenable contentions in order:

(a) The Bond Product Is New and Useful and Possessed of the Quality of Invention.—We agree that in order to be patentable, a composition of matter must have these statutory patentability prerequisites: (1) novelty, (2) utility, and (3) the quality of inventiveness.* And we submit that the Bond mixed inoculant has all three as was found by the court below.

(1) That the Bond product is *new* within the meaning of the term "novel" found in the patent statute need not rest only on the finding of the court below that the product was "new and different," but it stands as well upon petitioner's concession of no "anticipation by reason of the prior art." The full implication of no anticipation is that prior to Bond's patent there was no mixed inoculant like or substantially like Bond's, for in order to negative "novelty" or, as it is usually expressed, "to anticipate," it is necessary that all of the elements of the invention or their equivalents be found in a single description or structure where they do substantialy the same work in substantially the same way. *Imhaeuser* v. *Buerk*, 101 U. S. 647, 660; *Bates* v. *Coe*, 98 U. S. 31; *Walker on Patents* (Deller's Ed.), Sec. 47, pp. 254, 255. Nor is "novelty" negatived by anything beneficially incapable of the function of the patent even though apparently similar thereto. Walker on Patents, *ibid.*

Petitioner indulges in confusion of thought (Br. pp. 28-32) when it concedes *arguendo* that Bond was the first to make a "commercially successful mixed inoculant" and then argues that "a thing may be new in the sense that it is placed on the market, but that does not make it new in the patentable sense," relying on *Collar Co.* v. *Van Dusen*, 23 Wall. 530, and *Boston Pencil Pointer Co.* v. *Automatic*

*R. S. § 4886, Appendix, *post* p. 75.

Pencil Sharpener Co., (C. C. A. 2), 276 Fed. 910, 912, to support the contention that Bond's product nevertheless is not new.* Those cases really dealt not with the word "novel" as used in the statute, but with the domain of invention, which is still another statutory prerequisite and which we shall consider under (3) (*post* p. 45). The true significance of the decisions relied on by the petitioner is explained in Walker on Patents, *ibid*, thus:

> "* * * The novelty required in order that an invention may be protected by a patent is that it must be new. Statements that some things are not patentable because, though new in a commercial sense, they are not new in the eye of the patent law, occur in a few reported cases. [*Boston Pencil Pointer Co.* v. *Auto. Pencil Sharpener Co.*, 276 Fed. 910, C. C. A. 2 (1921).] In every such instance, however, it would have been more accurate to say that some things are not patentable because, though new things, they are not invented things. **Such things lack patentability not because they lack newness, but because they lack invention.** [*Boston Pencil Pointer Co.* v. *Auto. Pencil Sharpener Co.*, *supra*; *Aro Equip. Corp.* v. *Herring-Wissler Co.*, 84 F. (2d) 619, C. C. A. 8 (1936).] The question belongs to the domain of invention and not to that of novelty, and it is therefore treated in the third chapter of this book."

Without question, therefore, in view of the finding of the court below that Bond's product is "new and different," fortified by petitioner's concession of no anticipation by reason of the prior art, the novelty requirement of the statute is met.

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* Petitioner argues (Br. p. 32) that as Bond did not change the noninhibitive kind of bacteria, the "newness" for which the patent was upheld is the discovery of a natural phenomenon "without regard to whether there is a 'new' structure." This is plain distortion of the court's opinion which expressly found Bond's product to be "new and different" (R. 824).

(2) That the Bond product is "useful" within the meaning of the patent statute is not seriously denied by petitioner. To possess utility, an invention must be capable of producing a result, and that result must be a good result which may be so applied in practical affairs as to prove advantageous in the ordinary pursuits of life. An invention is useful within the meaning of the statute if it is capable of performing some beneficial function claimed for it. *Smith* v. *Nichols*, 21 Wall. 112; *Seymour* v. *Osborne*, 11 Wall. 516.

The District Court was impressed with the "results" obtained by Bond, stating that his work and its value are not to be minimized, and the court below found that the Bond composite was one "contributing utility and economy to the manufacture and distribution of commercial inoculants" and was "successful, efficient and filling the need it was meant to fill." These concurrent findings are clearly supported by the evidence; they should not be disturbed. *Williams Co.* v. *Shoe Machinery Corp.*, 316 U. S. 364, 369, and cases *ante* pp. 32-33.

(3) That the Bond product resulted from the exercise of uncommon talent and thus meets the third statutory prerequisite is abundantly shown by the undisputed evidence; it is implicit in the trial judge's finding that Bond was diligent and ingenious and the discoverer of the existence of noninhibitive strains, and it was expressly found by the court below.

The history of the struggle since 1907 to provide the American farmer with a satisfactory mixed culture for field seeds leaves no room for any doubt of the inventive quality of Bond's work. It is at once absurd to say, in view of the salient historical facts, that (1) it was within the skill of the calling to produce the Bond mixed inoculant, or (2) the disclosure of the patent is less than an

outstanding contribution to the art. The classical aphorism of the late Justice Holmes in *New York Trust Company* v. *Eisner*, 256 U. S. 345, "a page of history is worth a volume of logic," requires summarily a rejection of the contention that however "skillfully Bond brought the noninhibitive bacteria together, and even though there was produced a commercial inoculant that was more efficient," it is still "the product of skill, not of invention."*

Bond taught those working in the art not only that a satisfactory mixed culture for field legume seeds could be made, but also how to make it. Specifically he *discovered* and published to the world the existence of mutually noninhibitive strains of root nodule bacteria which can be selected and isolated by standard and routine tests. With this startling discovery as his genesis, Bond taught the art that to produce an efficient, dependable mixed culture, the selected noninhibitive strains or species of bacteria should be grown separately and then incorporated in large numbers of substantially the same order of magnitude in a powder base low in, or substantially free from, nutrient.

Without question Bond took the *last step* which solved the problem of thirty years' standing of how to prepare a satisfactory commercial mixed culture for leguminous plants of the field type. *Cf. The Barbed Wire Patent*, 143 U. S. 275, 283; *Consolidated Valve Co.* v. *Crosby Valve Co.*, 113 U. S. 157, 179. But not only did Bond take the last step which turned failure into success, but also he disabused the art of a misconception which was the very foundation of the failure. As was said by Judge Learned Hand in

* The facts in *Altoona Publix Theatres, Inc.* v. *American Tri-Ergon Corp.*, 294 U. S. 477, from which petitioner borrowed this quotation (Br. p. 35), are entirely different from those present here. The use of a flywheel, which was the gist of the invention, was an obvious prior art expedient within the skill of the calling, and no new result was obtained.

E. I. Du Pont de Nemours & Co. v. *Glidden* (C. C. A. 2), 67 F. (2d) 392, 397:

> "* * * If Flaherty did no more than disabuse the art of a misconception, it is evidence of originality; most of us persist in what we are accustomed to believe. Though all he did was to carry forward the existing knowledge that lower viscosity would result in greater coverage, other competent persons had tried to use that knowledge; the stimulus to success was great, and the art had been either strangely inert, if the combination was obvious, or else obsessed with a belief that low viscosity was impracticable. The result was a new and unexpected product, recognized as such, and used to much advantage. We know of no rigid doctrine, divorced from those practical considerations which rightly or wrongly are basic in the patent law, that forbids to such an advance the name of invention."

Of course, now that the last step has been taken, the hindsight of those who failed to solve the problem must be cautiously received and carefully examined. Present day knowledge must not be read into prior art patents which taught the art nothing and which have "emerged from oblivion solely to meet the exigencies of this litigation" or into the unused and unusable inoculants described in the prior publications or into the garden variety cultures as to the characteristics of which there is no clear and convincing proof. Neither should the seeming simplicity of Bond's work adversely affect the question whether inventiveness was exercised. See *Expanded Metal Co.* v. *Bradford*, 214 U. S. 366, 381; *Diamond Rubber Co.* v. *Consolidated Tire Co.*, 220 U. S. 428, 435; *Goodyear Co.* v. *Ray-O-Vac Co.*, 321 U. S. 275. In the *Goodyear* case, Mr. Justice Roberts said:

> "Viewed after the event, the means Anthony adopted seem simple and such as should have been obvious to those who worked in the field, **but this is not enough to negative invention.**"

The trial court found that Bond had been diligent and ingenious and the court below thought that he "made an inventive step forward in the art of production and commercial distribution of composite inoculants" and that the teaching in his patent of the production of a "composite inoculant, successful, efficient, and filling the need it was meant to fill" was an "inventive conception." There is abundant factual support in the evidence for these findings. They should not be overturned unless clearly erroneous and except for cogent reasons. *Williams Co.* v. *Shoe Machinery Co.*, 316 U. S. 364, 367.*

(b) The Patentable Application of a Discovery of a Law of Nature Is Not Dependent Upon Modification or Change of the Natural Force or Agency; nor Is It Dependent on Use in a Manner or for a Function That Is Not Accomplished in Nature.—The underlying basis of petitioner's discussion under Point I (Br. pp. 19-27) is a fundamental fallacy adopted and pursued by petitioner without justification or warrant either under the patent statutes or the precedents, *i.e.*, that patentable invention was not achieved by Bond because he did not change or modify the bacterial life or use it for a purpose or function foreign to the natural function or add to or take something away from the bacteria themselves. The fallacy is repeated with variations in the discussions under Points II and III, where it is argued (Br. pp. 28-35) that contributions existing in nature cannot be the basis of patentable invention.

* Such cases as *Hotchkiss* v. *Greenwood*, 11 How. 248, 266; *Rubber Tip Co.* v. *Howard*, 20 Wall. 498, 507; *Smith* v. *Nichols*, 21 Wall. 112, 119; *Toledo Pressed Steel Co.* v. *Standard Parts, Inc.*, 307 U. S. 350, 356, and *Old Town Ribbon Co.* v. *Columbia Co.* (C. C. A. 2), 159 F. (2d) 379, 382, involved different factual considerations. In order to impair these decisions even superficial resemblance, petitioner's distorted view of the evidence and facts which was rejected by the court below must be accepted.

There is absolutely no basis for petitioner's restrictive and unreasonable construction of our patent laws. Certainly the decisions relied on by petitioner do not support it, as we shall presently show. The true rule is that evident from our discussion (*ante*, pp. 36-41) of the difference between patentable invention and merely describing and attempting to patent the discovery of a principle or law of nature, as, for example, the doctrine of the *Mackay* case, that a novel and useful structure created with the aid of or utilizing a natural agency or a scientific truth is patentable. It is not a necessary element of patentable invention that the natural agency or force be used in a manner or for a function that is not accomplished in nature. As man is incapable of changing or modifying the immutable laws of nature, no court has ever required that he do so to qualify as an inventor. All that is necessary is that the natural agency or force be placed in a specified condition and used in that condition for a practical purpose. *The Telephone Cases*, 126 U. S. 1, 534; *Cameron Septic Tank Co.* v. *Village of Saratoga Springs* (C. C. A. 2), 159 Fed. 453.

The phrases "application of the principle" and "application of a discovery of a law of nature" as used in the decisions upholding patentability (*ante*, pp. 37-39) denote only the embodiment of the principle or natural agency or force in some physical structure, composition or art; in other words, these phrases signify the reduction to practice of the principle or agency or force.

According to Robinson on Patents, Vol. 1, Sec. 140, p. 200, until a principle is reduced to practice "it is not a complete invention, nor does it stand on any higher ground of legal merit than the discovery of an existing natural power. It must become 'a principle, put in practice and applied,' a 'practice founded on principle,' before it passes from the

shadowy regions of mere intellectual apprehension into the domain of the industrial arts." The same learned writer states (Sec. 143, p. 203) that when the courts say that "one who has discovered and *applied* a principle is entitled to all methods of applying it," which is the rule deducible from *Househill Co.* v. *Neilson*:

> "they speak of an idea of means, capable of being applied or reduced to practice in different instruments or operations, each of which is the tangible embodiment of the same idea, and all of which are only formal variations of the same substantial means."

The critical difference between patenting a discovery and patenting an application of the discovery is that in the first case, an attempt is made to monopolize a principle or an abstraction or a result, whereas in the second case the monopoly exists only in respect of a specific embodiment or connection of the principle with corporeal substances in a condition to act and produce effects in the industrial arts. Novelty, utility, and invention being met (*ante*, pp. 43-48), it is not otherwise necessary that Bond's application or embodiment of a natural agency be along lines or for purposes which require the agency to function otherwise than naturally.

If petitioner's conception of what constitutes patentable application of a principle or natural agency is correct, and of course it is not, then literally thousands of the important patents granted under our patent system and utilizing natural forces or agencies for the very same functions accomplished in nature, should never have been granted; indeed, very few of the contributions made to the advancement of the arts and sciences since the founding of our republic could have qualified for patenting. Petitioner's view of the law is illogical and absurd; it is not supported by any decision.

Thus *Morton* v. *New York Eye Infirmary*, 17 Fed. Case 881 (S. D. N. Y. 1862) (Pet. Br. p. 20), serves only to crystallize the difference, already adverted to by us (and admitted in that case by the court), between a claim to the discovery of a new principle and a claim to the use of a principle in a particular medium or mechanical contrivance by which it acts on the material world. True the patent there was held invalid, but the broad and sweeping doctrine claimed for the case is not justified. The patent in the *Morton* case attempted to cover *all surgical operations* in which ether was used as an anesthetic—not a physical or other corporeal embodiment or application of the discovery.* The result reached in that case is not dispositive here because Bond manifestly has not attempted to patent the process of fixing nitrogen in leguminous plants. The Bond claims relate to a specific composite inoculant in which advantage is taken of a discovery. Nothing is said in the *Morton* case, either expressly or by implication, to the effect that a modification or change of the natural agency must be made.

Nor does *Le Roy et al.* v. *Tatham et al.*, *supra*, (Pet. Br. pp. 22-24), forbid the grant of a patent for a new and useful composition of matter utilizing a natural agency for a practical purpose. As we have observed, this case expressly recognized the principle of law on which the court below relied. This decision and the *Telephone* cases (Pet. Br. p. 24) may be searched in vain for any ground or other support for petitioner's unreasonable conception of what

* Morton and Jackson admitted in their patent that, prior to their invention, fumes of sulfuric acid ether (di-ethyl ether, $CH_3CH_2OCH_2CH_3$) had stupefied persons and animals who breathed the fumes, their alleged invention being solely the discovery that while in this condition persons could be operated on without pain and without movement due to muscular contraction. Thus, the patentees had neither discovered ether itself nor the effects of ether.

constitutes a patentable application of a principle or discovery.

Equally unavailing to petitioner is *O'Reilly et al.* v. *Morse et al.*, 56 U. S. 62 (Pet. Br. p. 23). The doctrine of that decision is applicable only in the case of claims covering a principle, function, or result *without more*. The eighth claim of Morse, instead of being directed to a specific embodiment and application of the discovery, as was true of the first seven claims which this court upheld, was directed to the natural force or principle itself irrespective of the "specific machinery or parts of machinery described" in the specification and preceding claims. It was not held in this case, as intimated by petitioner, that in reducing a natural force to practice, a change or modification of the force must be made.

Smith v. *Nichols*, 21 Wall. 112 (Pet. Br. p. 23), also does not lend any support to petitioner's interpretation. That case had nothing whatever to do with a law of nature situation. The decision stands only for the well recognized proposition that a mere change in degree is not patentable invention.

De Forest Radio Co. v. *General Electric Co.*, 283 U. S. 664 (Pet. Br. pp. 24-25 and 35) does not even superficially resemble the case at bar. On close scrutiny, the decision does not go as far as the brief quotation made by petitioner suggests. Langmuir appears to have utilized the current knowledge of the art in 1913 to claim as his invention the exhaustion of the occluded gases in a vacuum tube by which he reduced or eliminated the phenomenon of ionization during use. It was known that the phenomenon of ionization made for unsteadiness and demanded nice adjustment for each tube in a radio circuit. Thus, reduction so far as possible of the phenomenon, and causing the electrons to pass *in vacuo* from the filament to the plate, was a desirable

and well-known condition, having been declared in scientific periodicals by Lillienfeld. Langmuir's disclosure was merely that of a completely exhausted tube; at the time of his application there was no demand for such a tube and the art did not yet need it. Thus Langmuir merely put in practical form, before needed, the scientific discoveries of others. Read in this light, the quotation from this court's opinion is entirely inapposite here.

In further pursuit of petitioner's basic fallacy, *i.e.*, that it is essential to validity that Bond should have changed or modified his bacteria, it cites and relies on *Union Carbide Co.* v. *American Carbide Co.* (C. C. A. 2), 181 Fed. 104, and *J. E. Baker Co.* v. *Kennedy Refractories Co.* (C. C. A. 3), 253 Fed. 739. A close examination of these opinions, which were particularly relied on by the court below, will show that the distinction which petitioner makes is quite irrelevant. For example, the significance of the *Union Carbide* decision resides in the similar contentions of the infringer there and the infringer here, *i.e.*, that the patent is not for a new product, but for a new form of an old product, having the same composition, properties, and uses of the old. The amorphous calcium carbide in that case may be considered *arguendo* the equivalent in this case of the mixtures of natural bacterial life found in nature; the crystalline form there in the same position as the mixed inoculant of Bond here. Patentability there was upheld because it was founded (181 Fed. 106-107):

> "upon superior efficiency; upon superior durability, including the ability to retain a permanent form when exposed to the atmosphere; upon a lesser tendency to breakage and loss; upon purity, and, in connection with other things, upon comparative cheapness."

Similar attributes may be ascribed to the Bond product as compared to natural bacterial life, and the conclusion

of the court in the *Union Carbide* case aptly expresses the clear right of the Bond product to patentability, thus (pp. 107-108):

> "For these reasons, it is held that the product possesses the requisite patentable novelty. And we must regard this conclusion as not only well founded in law, but as most just. **To hold an important discovery which has given to the world a commercially new product—a product the high utility of which must be conceded—not entitled to protection for want of novelty, would, as it seems to us, be applying the patent statute to defeat its fundamental purposes.**"

General Electric Co. v. *De Forest Radio Co.*, (C. C. A. 3), 28 F. (2d) 641, clearly is not in point, for there the broad claim of the patent read;

> "26. Substantially pure tungsten having ductility and high tensile strength."

The remarks of the court relied on by petitioner were addressed to this palpable effort to claim a product of nature and no more. It is a far cry from Coolidge's claim to the claims here; Bond does not claim only alpha strains of bacteria, but on the contrary he claims a corporeal embodiment (a mixed inoculant employing alpha strains) capable of practical use and which does not exist in nature, as does pure tungsten.

Universal Winding Co. v. *Foster Mach. Co.* (D. C. Mass.), 16 F. Supp. 671, is also inapposite. No one quarrels with the abstract rule quoted by petitioner. Significantly, however, the quotation does not support petitioner's contention that changes in natural forces are required. Quite the opposite, it is clearly implied that all that is required is that the patentee merely bring the law of nature *into operation* by novel means. Bond's new and different product clearly satisfies the rule of this case.

All that the patentee had done, in *Novocol Chem. Co.* v. *Powers & Anderson Dental Co.* (C. C. A. 4), 128 F. (2d) 904, 907, was to satisfy himself that the cause of discoloration of epinephrin was oxidation and not contact with the rubber or glass of the containers. This scientific fact was well known, and prior workers had attempted airtight cartridges. It was accordingly held that no "great originality of thought" was involved in the conclusion that "some air was reaching the solution" in the prior devices. The case is not in point because there the remedy was obvious and of long practice (128 F. (2d) 907). Here Bond's solution was not obvious; neither was it one of long practice (*ante*, pp. 43-48). The *Novocol* case does not indicate that a change or modification of the physical fact is required; on the contrary, petitioner's quotation reveals that patentability is achieved when the discovery is utilized in an invented thing.

The foregoing analysis of the decisions relied on by petitioner clearly shows that the contention that the Bond patent is invalid because he did "not make any change in or modify the bacteria used in his product" must fail.

(c) The Inoculant Disclosed in the Bond Patent Is Properly Classifiable as a Composition of Matter.—The words "composition of matter" found in the patent statute R. S. 4886, 35 U. S. C. Sec. 31, presuppose only a composite material consisting of a number of elements. The phrase "covers all compositions of two or more substances. It includes all composite articles, whether they be results of chemical union, or of mechanical mixture." Walker on Patents (Deller's Ed.) Sec. 14, p. 55. See also *Keasbey & Mattison Co.* v. *Philip Carey Mfg. Co.* (C. C. N. Y.), 139 Fed. 571, 573; *Union Carbide Co.* v. *American Carbide Co.* (C. C. A. 2), 181 Fed. 104, 106-107; *J. E. Baker Co.* v. *Kennedy Refractories Co.* (C. C. A. 3), 253 Fed.

739; *National Battery Co.* v. *Richardson Co.* (C. C. A. 6), 63 F. (2d) 289, 292; *Kuehmsted* v. *Farbenfabriken of Elberfeld Co.* (C. C. A. 7), 179 Fed. 701, 705; *Parke-Davis & Co.* v. *H. K. Mulford Co.* (C. C. N. Y.), 189 Fed. 95, 103.

In *National Battery Co.* v. *Richardson Co.*, Judge Hickenlooper said (63 F. (2d) 292):

> "* * * The fact that all the elements of patentee's composition had formerly been used separately to perform the same or similar functions, or had been used in various other but never the same combinations, will not defeat the patent. *Bates* v. *Coe*, 98 U. S. 31, 48, 25 L. Ed. 68; *Emery* v. *George H. Bowman Co*, 11 F. (2d) 525 (C. C. A. 6). The question then is whether the new combination would be obvious to one skilled in the art to whom the problem was submitted for solution. *Webster Loom Co.* v. *Higgins*, 105 U. S. 580, 591, 26 L. Ed. 1177."

A "composition of matter" is thus a product involving inventive conception and formed by the intermixture of two or more substances or ingredients. Each of the ingredients is, of course, a means to an end, but the true attributes of a "composition of matter" result either from the *positive* or *negative* (as the case may be) relationship or interaction of the ingredients in producing a new and characteristic use or result. Thus the essence of a true composition of matter resides in the intermixture and relationship of the individual ingredients in a whole complex utilized as a unit, each ingredient being necessary to the common result and "yielding something to the useful arts." (179 Fed. 705.)

The subject matter of the Bond claims easily meets the requirements of a "composition of matter." As disclosed, as claimed, and as used, the Bond inoculant is much more than natural bacterial life *per se*. It is a combination of selected bacterial strains placed together in a specified con-

dition, *i. e.*, large numbers, in a powder base of low nutrient; thereby it became "for every practical purpose a new thing." (189 Fed. 103.)

It is true that, as specified in the Bond patent claims, the different bacterial species "do not affect one another in their ability to fix nitrogen," and that when each species of the mixed inoculant works it does so independently of the others. But it is mere play on words to say that this is aggregation and not a true composition of matter, or that each element has not lost its identity. A brief consideration of the salient facts compels the conclusion, reached by the court below, that Bond's product has the essential attributes of a "composition of matter."

The most important desired end in the seed inoculant art was the provision of an inoculant containing two or more different species of bacteria which are not injuriously affected by each other during packaging, storage, and distribution. Without the attainment of this important end the optimum inoculation of the several types of seeds for which the mixture is intended cannot be secured.

The evidence leaves no doubt that the problem which confronted the seed inoculant manufacturers respecting mixed cultures for field seeds was one of storage and distribution. The jobbers and dealers had long required a convenient form of handling and distributing field seed inoculants other than in separate cartons (R. 140-141). It was to the solution of this problem that Mr. Bond turned, and it was his discovery of the existence of noninhibitive strains of bacteria which paved the way to the preparation of a mixed culture which satisfied a long-felt want. Thus the Bond invention resided in assuring a *negative* relationship as between the different species as distinguished from a *positive* interaction. Where the inventive step lies in the provision of a *negative* rather than a *positive* condi-

tion, and where, indeed, this was the desideratum itself, it is both illogical and absurd to contend, as does petitioner, that a true composition of matter has not been achieved merely because of the absence of positive interaction or because the elements do not lose their identity.

Even though the individual bacterial species in the Bond inoculant do not interact in the mixture, they cooperate in that they are capable of living together without harmful interaction and can thus fulfill the purpose for which the mixture was intended; they also cooperate in that they have individual qualities which permit them to be present in a unit intended for a single purpose; and they also cooperate with each other in that although each performs its particular function only, they jointly contribute to the provision of a mixture heretofore unavailable which may be safely packaged, stored, and distributed.

The principal object of the Bond invention is to provide an inoculant or mixed culture containing two or more species of bacteria which are *not* injuriously affected by each other but which function with the same efficiency as if the separate species of bacteria were contained in separate inoculants. *This lack of inhibition or of adverse effect on each other by different species of bacteria in a mixed inoculant is new in the art.* Such an inoculant, a true composition of matter, was made possible by the step forward made by Bond. The court below was convinced that Bond's inoculant was a true composition of matter when, after reviewing the evidence, it said (R. 827):

> "Thus he taught how to make a composite inoculant, successful, efficient and filling the need it was meant to fill. This is not so-called 'aggregation.' It is inventive conception."

It is to be noted that in the *Sharpless case*, 287 Fed. 655, from which petitioner quotes (Br. p. 28), the court said (p. 658):

> "* * * It is to be observed Congress provided for invention in respect 'of composition of matter' as one of the four classes of invention. There is no restriction as to the nature of the composition which may be patented. **The only limitation is they must be new, useful, and the result of invention.**"

Since, as we have shown (*ante* pp. 43-48), the Bond product meets the three requirements of the statute (the only limitation), it is patentable as a composition of matter.

The language from the *Sharpless* case, on which petitioner relies, is merely exemplary of one way in which a patentable composition of matter "may well result or be formed" for it clearly was not intended as a "restriction as to the nature of the composition which may be patented." In any event the "different or additional" property which the Bond inoculant possesses is its ability (not possessed by any of the individual ingredients) to fix nitrogen in leguminous plants of more than one cross-inoculation group with the same efficiency as single inoculants utilizing the same strains.

American Fruit Growers, Inc. v. *Brogdex*, 283 U. S. 1 (Pet. Br. p. 27), decides only the question of what constitutes a "manufacture" as that word is employed in the patent statute. The patent disclosed a method of preparing fresh citrus fruit for market by applying borax to the skin or rind, and sought to claim as a new article of manufacture:

> "26. Fresh citrus fruit of which the rind or skin carries borax in amount that is very small but sufficient to render the fruit resistant to blue mold decay."

It was held by this Court that the addition of borax to an orange did not produce any change in its name, appear-

ance, or general character, and hence the claim did not relate to a "manufacture" as that term had been defined in previous decisions of this Court.

"Manufacture" and "composition of matter" are separate and distinct statutory classifications. A precedent dealing with one of these classifications is not in our submission controlling as to the other.

It is of no minor significance or weight that the Patent Office in issuing the Bond patent in suit has created a presumption of classifiable statutory subject matter. Thus *prima facie*, by virtue of the very grant of Bond's patent, the Bond mixed inoculant is a true "composition of matter." This *prima facie* is reinforced abundantly by the presence in this record of numerous patents dating as early as 1907, issued for similar subject matter by those in charge of the administration of our patent laws (R. 780-808). A long-standing administrative interpretation of the patent statute recognizing employment of natural bacterial life as statutory subject matter should not now be lightly overturned on the basis of the strained and fallacious arguments of petitioner.

It is a well-settled principle of federal statutory interpretation that the construction given a statute by those charged with its execution has weight with the courts and will not be overruled without cogent reasons. *United States* v. *Moore*, 95 U. S. 760. The principle has been applied in ascertaining the meaning of "manufacture" as used in the patent statute, *Riter-Conley Mfg. Co.* v. *Aiken* (C. C. A. 3), 203 Fed. 699, 702, (Cert. Denied 229 U. S. 617) and for the purpose of construing the Copyright Act (15 U. S. C. § 12), *Washingtonian Publishing Co.* v. *Pearson*, 306 U. S. 30.

(d) The Vitamin Technologists Case Is Not Parallel to the Facts in This Case.—The claimed process involved

in the *Vitamin Technologist* case (146 F. (2d) 941) was that of preparing food materials and exposing them to irradiation by ultraviolet rays for a period sufficient to effect antirachitic activation, which was held invalid by the court by virtue of anticipation.

The undisputed evidence in that case showed that man had always employed this process in the sun-drying of hays and coconut meat. It was also shown that prior to Steenbock's application for patent, Goldblatt and Soames had applied ultraviolet rays to living rats and had thus produced in their livers an antirachitic factor whereby the livers, when fed to rachitic rats, aided or cured their rickets. Likewise Hume and Smith had, prior to Steenbock, used an ultraviolet lamp to irradiate sawdust, producing in it vitamin D which rachitic rats ate and were cured. Steenbock was familiar with the work of the earlier scientists, and therefore merely determined the scientific principles involved. The court properly held that the determination of the reason of a prior used process is not patentable invention, the process itself being anticipated.

A critical difference between the facts in the case at bar and those in the *Vitamin Technologists* case is that Bond, unlike Steenbock, did not merely determine the reasons for the successful operation of prior mixed inoculants, there being no such inoculants either described or used. Instead, Bond discovered the existence in nature, contrary to universal belief, of noninhibitive strains of bacteria; and aided by this scientific knowledge, Bond selected and combined noninhibitive strains in a composite inoculant which had never before been known.

Whereas Steenbock's process was held to be anticipated, petitioner has conceded no "anticipation by reason of prior art" of Bond's product, and therefore its contentions that the unsuccessful prior mixed inoculants would if used today

infringe the Bond patent because they may have contained both inhibitive and noninhibitive strains of bacteria are unavailing. Petitioner has wholly failed to prove that the prior mixed inoculants contained noninhibitive strains (*ante*, pp. 33-35) and hence cannot be heard to say that Bond merely recognized a scientific truth employed in the prior inoculants.

The discussion in Judge Healy's concurring* opinion concerning the patentability of a discovery of a law of nature has no persuasive force, because in this respect he was dissenting from the majority opinion of the court, which said (146 F. (2d) 949):

> "Appellant also argues that the patents seek a monopoly of the ultra violet rays of the sun or lamp, a natural force, and are hence invalid under our decision in *Wall* v. *Leck*, 9 Cir., 66 F. 552. We do not agree.
>
> * * * * *
>
> "The ultra violet rays of the mercury vapor lamp are natural forces, like such rays in the sun's spectrum, in the sense there are no forces but those of nature of which man is a part. But their use when created by a lamp to activate the antirachitic principle in lipoids processed by exposure to the lamp rays **if not anticipated and properly claimed**, is as patentable a process as the use for motor power of electricity created by a dynamo, though the electricity so created be identical with that of the lightning of an electric storm."

The *Vitamin Technologists* case is thus revealed as another authority recognizing the exception to the law of nature rule (*ante*, pp. 36-42) and confirming that an application of a natural force or scientific truth in a novel and useful structure is patentable invention. Invalidity there was occasioned by anticipation. Bond's product is not anticipated.

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* The opinion is designated as "concurring", for the reason that Judge Healy agreed with the result of the main opinion and specifically with the finding of anticipation.

II.

PATENT CLAIMS THAT DEFINE A NEW BACTERIOLOGICAL PRODUCT DISTINCTLY AND EXACTLY IN THE ONLY LANGUAGE AVAILABLE TO THE ART, FULLY MEET THE REQUIREMENTS OF THE STATUTE AND ARE NOT INVALID AS BEING FUNCTIONAL.

The patent statute (Appendix, *post*, p. 75) requires only that an applicant "particularly point out and distinctly claim the part, improvement or combination which he claims as his invention." The vice of the claims which this Court has struck down as not in compliance with this provision of the statute lies not in the mere use of functional language, but rather in the failure of the claims to depict the invention with the particularity and distinctness required by the statute, and in the consequent extension of the patent monopoly beyond the real invention or discovery.

In *Holland Furniture Company* v. *Perkins Glue Company*, 277 U. S. 245, the real invention "was that by the use of a particular kind of starch as an ingredient a new composition of matter was made." The claims in suit, however, did not describe the particular ingredient, but instead called for a glue having a starch base and capable of performing all the functions of animal glue. This, it was said, was an attempt to cover all starch glues having these properties, thereby to exclude others from all types of starch and extend the patent "beyond the discovery." The vice of the claims lay in their effect on the art, not in the mere fact that *functional* language was employed. Obviously non-functional language was available to the patentee. Thus this Court said (p. 255):

> "* * * The glue made of this ingredient within the specified range was a new product. * * * As such it was entitled to the protection of a patent but as thus described and limited petitioner's product does not infringe."

Again, in *General Electric Co.* v. *Wabash Appliance Corporation*, 304 U. S. 364, the invention consisted of a filament for electric lamps composed of tungsten made up of grains of a particular size and shape, but the claim instead of specifying the structure of the grains, defined them as being

> "of such size and contour as to prevent substantial sagging and offsetting."

This Court, referring to the *Holland* case, held (p. 371) that the claim, which merely described the function of the grains, was "insufficient" as a description of the invention, and that the vice of the "conveniently functional language" was that it "would extend the monopoly beyond the invention." As in the *Holland* case, other language might have been employed to define the actual invention, and this Court recognized not only that difficulties of language might be encountered, but also that functional language *per se* is not proscribed by the statute, saying (pp. 371, 372):

> "A limited use of terms of effect or result, which accurately define the essential qualities of a product to one skilled in the art, may in some instances be permissible and even desirable, * * *.
>
> * * * * * *
>
> "* * * The difficulty of making adequate description may have some bearing on the sufficiency of the description attempted, * * *."

The most recent pronouncement of this Court (*Halliburton Oil Well Cementing Co.* v. *Walker*, 329 U. S. 1) merely extends the doctrine of the *Holland* and *General Electric* cases to machine or combination claims. Again the vice of the claims was held to be that they were too broad and if sustained would extend the monopoly beyond the real invention of the patentee. The language, so aptly used by the Court to distinguish between a proper (physical character-

istics or arrangement) and an improper (what it will do) description of the "tuned acoustical pipe" which constituted the crucial element of the claims there involved, becomes, in the light of the facts of that case, entirely inapposite here.

In the *Halliburton* case, Walker's improvement consisted of adding to the prior Lehr and Wyatt machine a well known mechanical acoustical resonator which did not change or modify the fundamental measuring and recording functions, but merely enabled a more accurate indication to be recorded on a graph by means of more prominent, easier to count, waves. Claims of the patent not in suit, such as claims 2 and 3, described (or specified), Walker's tuned acoustical pipe as an integral part of the whole device showing its structure, its working arrangement in the combination, and the manner of its connection with the other parts. Halliburton, who employed an electrical filter in lieu of Walker's mechanical acoustical resonator, did not infringe and was not charged with infringement of these claims. On the other hand, not one of the claims in suit which Halliburton was found to infringe, *e.g.*, claims 1, 13, 14, 15, and 17, even suggested (a) the "physical structure of the acoustical resonator," or (b) the "physical relation" of Walker's addition to Lehr and Wyatt, or (c) the manner in which it operated together with the old machine to achieve the new function. For example, typical claim 1 defined the "resonator and its relation to the rest of the apparatus" as "means associated with said pressure responsive device for tuning said receiving means to the frequency of echoes from the tubing collars of said tubing sections to clearly distinguish the echoes from said couplings from each other."

Without question, therefore, not only did the claims in suit fail "adequately to depict the structure, mode, and

operation of the parts in combination," but also the most crucial element of the combination was claimed in terms of the function or result of the resonator. It is also plain from the very contention of Walker that the claims were intended to bar anyone from using in an oil well "any device heretofore or hereafter invented which combined with the Lehr and Wyatt machine performs the function of clearly and distinctly catching and recording echoes from tubing joints with regularity" (329 U. S. 12).

Thus the situation before this Court in the *Halliburton* case was this: Walker's resonator was capable of precise physical description; some of the patent claims contained such description; others, those in suit, did not employ such description, but on the contrary defined only the function or result of the resonator; the defendant Halliburton was not using Walker's actual invention, did not infringe those claims which employed the physical descriptions, but did, by a device (an electric filter) not disclosed or suggested by Walker, achieve the latter's function or result.

In the case at bar, the bacterial life employed in Bond's product is incapable of mere physical description; in fact, it is customarily described and classified by its physiological characteristics, *i.e.*, what it will do. When dealing with legume bacteriology, scientists do not use as their tools definitions or language connoting physical characteristics. For example, it is conceded that the clover bacteria, *Rhizobium trifolii*, are distinguishable from the alfalfa bacteria, *Rhizobium meliloti*, not by their physical characteristics, but by the *effect that they have* on clover plants and alfalfa plants. So here, noninhibitive strains ("alpha" strains) do not differ from inhibitive strains in physical characteristics (Bond pat. R. 777, col. 1, lines 38-44). Pointing out that noninhibitive strains are not "readily iden-

tifiable in nature, as separate species," the court below said (R. 826):

> "There is no weight and measure method by which he (the scientist) may determine the quality or quantity of bacteria * * *"

In each of the Bond product claims there has been no attempt (as distinguished from Walker's claims) to define the noninhibitive strains employed in the mixed inoculant in terms other than those which a bacteriologist commonly uses; each claim specifies the bacteria physiologically, *i.e.*, what it will do.* Here petitioner (unlike Halliburton) used as its mixed inoculant an intermixture of the precise character described by Bond in his specification and defined in the claims in suit. The court below expressly found that petitioner uses noninhibitive strains of the type described and claimed by Bond, and this finding is not challenged. Here (unlike the *Halliburton* case) there is no purpose, express or implied, to bar anyone from achieving Bond's result save insofar as use of Bond's actual invention is concerned. Others are free to prepare and sell mixed inoculants; others are free to achieve artificial inoculation of legume plants; we insist here only that such others keep clear of Bond's reservation as described and claimed in his patent. Walker's difficulty was that he was claiming too much and was endeavoring to extend his monopoly beyond his actual invention. Bond is in no such difficult or unreasonable position.

There is nothing in the *Halliburton* case or in the statute

* Bond claim 2 (R. 779), the only product claim not in suit, was not asserted against petitioner only because petitioner does not sell a "3 in 1" mixed inoculant. There was no intention, therefore, to keep this claim out of suit for the reason which had compelled Walker to omit certain of his claims from suit. Similarly, Bond method claims 9, 10, and 11 were not asserted by respondent because petitioner merely sells but does not make the infringing product.

itself that militates against the use of physiological characteristics to distinctly define the claimed invention, nor has it ever been held that a statement of the physiological characteristics is objectionable as "functional."

In the case of *Guaranty Trust Co. of New York* v. *Union Solvents Corporation*, 54 F. (2d) 400 (D. Del.) (Aff'd. *per curiam* 61 F. (2d) 1041, C. C. A. 3, Cert. Den. 288 U. S. 614), the Weisman patent 1,315,585, which was held valid and infringed, identified and described the bacteria which constituted the crucial element of the invention solely by their physiological characteristics. Claim 3, for example, identified the bacteria as (p. 403):

> "the herein described bacteria which are capable unaided of converting sterile fermentable cereals substantially into acetone and butyl alcohol."

The court pointed out that the "herein described bacteria" had reference to the specification, and it clearly appears from the opinion (p. 404) that the specification identified and described the bacteria *solely by their physiological characteristics.*

The claims of the Bond patent define the product with precise exactness in language that cannot be misunderstood* and are not subject to the vice of the claims considered by this Court in the *Holland*, the *General Electric*, and the *Halliburton* cases, *supra*. Moreover, the claims do not exclude others from the use of all mixed cultures however made. The way is left open for experimentation and research to improve the base or carrier or to otherwise change the environment of the bacteria so as to permit the use of inhibitive strains. Furthermore, the public is en-

* None of petitioner's or respondent's experts had any criticism of the language employed in the Bond specification and claims. They had all read and they all understood the nature of the Bond invention, and the designation of the "alpha" strains by their physiological characteristics gave rise to no objections or doubts.

tirely free to use noninhibitive strains in single cultures just as they were before Bond's invention.

The case of *Standard Brands, Inc.* v. *National Grain Yeast Corporation*, 308 U. S. 34, does not stand for the rule stated by petitioner (Br. p. 38). The '105 patent there in suit was held invalid not because of the form of the claims, but because (p. 38):

> "The disclosure of the patent is * * * too vague and indefinite to constitute invention."

As to the disclosure of the Bond patent and the necessity of testing for non-inhibitive strains, the court below said (R. 826):

> "* * * True, routine experiments are to be employed, but these tests are conventional and well known to bacteriologists. The mere provision that the compound shall be made of strains or species of bacteria selected by familiar methods leaves nothing indefinite in the description. * * * Where those methods are old and well known to the art, no difficulty is encountered in a description for a patent composite which provides for their utilization or employment. In other words, Bond's tests were manifest to readers skilled in the art. No one so skilled would have any difficulty in determining what he should do when his attention was directed to the necessity of making them. *Eibel Process Co.* v. *Minnesota & Ontario Paper Co.*, 261 U. S. 45, 63. As the Supreme Court has indicated, we think that intelligent bacteriologists, setting out properly to gather together the enumerated ingredients which are prescribed for the composite article, reading the description, could hardly go astray. *Seabury* v. *Am Ende*, 152 U. S. 561. The requirement that preliminary tests must be made does not invalidate a specific method when their character and limitations are well known to the art. *Minerals Separation, Ltd.* v. *Hyde*, 242 U. S. 261; *A. B. Dick Co.* v. *Barnett*, 288 Fed. 799, 801 (CCA 2)."

Petitioner's discussion of patent claims involving a "Mental Operation" on the basis of the decision of this Court in the *Halliburton* case (Br. pp. 39-41) is wholly fallacious. The claims of the Walker patent there in suit were machine or combination, not "process", claims, and the claims here in suit are product, not "process", claims as petitioner states.

The suggestion that this Court's opinion in the *Halliburton* case dealt with an attempt "to monopolize functionally indefinite mental processes" is obviously unwarranted. The note in the George Washington Law Review, Vol. 13, No. 4, pages 498-9 cited by petitioner (Br. p. 41) does not refer to this Court's decision; on the contrary, the discussion is concerned with that part of the opinion of the Circuit Court of Appeals for the Ninth Circuit (146 F. (2d) 817) which invalidated Walker patents No. 2,209-944 and Re. No. 21,383, both of which were for *methods*, held to be "directed to mental steps", and neither of which came before this Court.

Obviously, the product claims of the Bond patent are not directed to "a method of computation" as was true of the patent in the *Don Lee* case (Pet. Br. p. 40) and of the two Walker patents invalidated in 146 F. (2d) 817.

The short answer to petitioner's discussion of "Therapeutic Methods" (Br. pp. 41-42) is that the Bond mixed inoculant is not *therapeutic*, nor is it a *method*. If it were true that the Brinkerhoff decision has established a tradition in the Patent Office, then the issuance of the Bond patent is persuasive that its subject matter does not fall within the tradition. The fact is that as recently as September, 1947, in a series of opinions as yet unpublished, the Patent Office Board of Appeals has ruled that the *Brinker-*

hoff case does not establish the broad doctrine asserted by petitioner. In one such case* the Board said:

> "The Brinkerhoff decision, as we read it, holds that claims involving the use of certain surgical instruments, already patented, are not patentable because such use is inherent in the article. While the exact factual situation of that case is by no means clear from the manuscript report, **we do not find therein a broad ruling to the effect that methods of treating disease are perforce unpatentable under the statute.**"

III.

PUBLIC IMPORTANCE IS NOT A GROUND FOR INVALIDATING AN OTHERWISE VALID PATENT.

Petitioner's Point V, "Public Importance," is unsound and ill conceived, if advanced as a ground for invalidating respondent's patent.

We know of no case where a patent which fulfills the statutory requirements as to subject matter and disclosures has been held invalid on the ground of public importance. On the contrary, as this Court said in *Hartford-Empire Co., et al.* v. *United States*, 323 U. S. 386, 432:

> "* * * If he (a patent owner) discloses the invention in his application so that it will come into the public domain at the end of the 17-year period of exclusive right he has fulfilled the only obligation imposed by the statute.
>
> * * * * * *
>
> "'A party seeking a right under the patent statutes may avail himself of all their provisions, and the courts may not deny him the benefit of a single one. * * * No court can disregard any statutory provisions in respect to these matters on the ground that in its judg-

* *Ex parte Tullar et al.*, Appeal No. 6999, decided September 9, 1947. A certified copy of this opinion is being lodged in the office of the Clerk.

ment they are unwise or prejudicial to the interests of the public.' *United States* v. *American Bell Telephone Co.*, 167 U. S. 224, 247."

As we have shown, the decision of the court below is in harmony with the rules established by this Court in upholding a patent for an invention which contributes "a desirable composite product which had not previously been achieved * * * and of which the public now has the benefit." Petitioner has wholly failed to sustain its burden of showing that the Bond mixed inoculant lacks the statutory prerequisites of novelty, utility and invention, and hence its contention that "public interest demands that there be no private monopoly" confirmed in Bond flies in the face of this Court's ruling in *The Telephone Cases*, 126 U. S. 1, 535, when it was said:

> "* * * It may be that electricity cannot be used at all for the transmission of speech except in the way Bell has discovered, and that therefore, practically, his patent gives him its exclusive use for that purpose, but that does not make his claim one for the use of electricity distinct from the particular process with which it is connected in his patent. It will, if true, show more clearly the great importance of his discovery, but it will not invalidate his patent."

The public is, of course, entitled to make free use of Bond's scientific discovery; but neither petitioner nor any other member of the public may make the application of that discovery which is found in the new and useful mixed inoculant defined by Bond's claims. Upon expiration of the Bond patent the public will then become fully vested with the right to make, use and sell Bond's product. If Bond had not applied for a patent but had, as was his right, kept his discovery secret, the public in that case would never come into possession of knowledge of how to make a suc-

cessful mixed inoculant. We fail to see, therefore, how "our nation's security, our prosperity and our lives" could be harmfully affected by a decision which upholds the Bond patent for a meritorious invention of a *new and useful* product.

Point V indicates more probably a realization by petitioner that, since it really seeks a retrial of the facts, the so-called legal reasons advanced in the petition for granting the writ in this case have evaporated and that this Court might well conclude that the writ was improvidently granted. *Cf. Keller* v. *Adams-Campbell Co.*, 264 U. S. 314, 319; *Layne & Bowler Corp.* v. *Western Well Works*, 261 U. S. 387, 393.

There are here no questions or principles the settlement of which are of importance to the public as distinguished from petitioner. The opinion of the court below is, as we have shown, really in harmony, and not in conflict, with the decisions of this Court; and there is no conflict among the Circuit Courts of Appeals either as to the validity of respondent's patent or as to the applicable rules of decision. Save for petitioner's contention that the industry to which respondent's patent relates is concentrated in the Seventh Judicial Circuit—a contention denied by respondent, however, and not adequately supported in the record—it should be manifest that there was no reason for granting the writ in this case.

But neither is there any basic issue of public importance raised here; this case is of no greater *moment* to the public than any other patent case. Petitioner's suggestion that "basic research in the use of bacteria in the field of medicine and industrial products as well as in the field of agriculture" is dependent upon the "correctness and soundness" of the decision of the court below, is an absurd one based wholly on petitioner's assumption, which we have

shown to be erroneous, that the court below upheld respondent's patent merely for the discovery of a law of nature.

CONCLUSION.

The court below has not improperly applied the law to the facts of this case. Its decision is correct and sound. If this Court does not dismiss the writ for having been improvidently granted, the judgment of the court below should be affirmed.

Respectfully submitted,

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APPENDIX.

PERTINENT STATUTES.

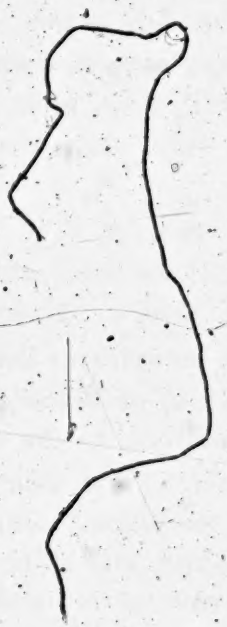
R. S. 4886, 35 U. S. C. A. § 31; March 3, 1897, c. 391, § 1, 29 Stat. 692; May 23, 1930, c. 312, § 1, 46 Stat. 376; Aug. 5, 1939, c. 450, § 1, 53 Stat. 1212.

Any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvements thereof, or who has invented or discovered and asexually reproduced any distinct and new variety of plant, other than a tuber-propagated plant, not known or used by others in this country, before his invention or discovery thereof, and not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof, or more than one year prior to his application, and not in public use or on sale in this country for more than one year prior to his application, unless the same is proved to have been abandoned, may, upon payment of the fees required by law, and other due proceeding had, obtain a patent therefor.

R. S. 4888, 35 U. S. C. A. § 33; July 8, 1870, c. 230, §26, 16 Stat. 201; as amended March 3, 1915, c. 94, § 1, 38 Stat. 958; May 23, 1930, c. 312 § 2, 46 Stat. 376.

Before any inventor or discoverer shall receive a patent for his invention or discovery he shall make application therefor, in writing, to the Commissioner of Patents, and shall file in the Patent Office a written description of the same, and of the manner and process of making, constructing, compounding, and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound, and use the same; and in case of a machine, he shall explain the principle thereof, and the best mode in which he has contemplated applying that principle, so as to distinguish it from other inventions; and he shall particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention or discovery. The specification and claim shall be signed by the inventor. No plant patent shall be declared invalid on the ground of noncompliance with this section if the description is made as complete as is reasonably possible.



SUPREME COURT OF THE UNITED STATES

No. 280.—October Term, 1947.

Funk Brothers Seed Company, Petitioner, v. Kalo Inoculant Company.	On Writ of Certiorari to the United States Circuit Court of Appeals for the Seventh Circuit.

[February 16, 1948.]

Mr. Justice Douglas delivered the opinion of the Court.

This is a patent infringement suit brought by respondent. The charge of infringement is limited to certain product claims [1] of Patent No. 2,200,532 issued to Bond on May 14, 1940. Petitioner filed a counterclaim asking for a declaratory judgment that the entire patent be adjudged invalid.[2] The District Court held the product claims invalid for want of invention and dismissed the complaint. It also dismissed the counterclaim. Both parties appealed. The Circuit Court of Appeals reversed, holding that the product claims were valid and infringed and that the counterclaim should not have been dismissed. 161 F. 2d 981. The question of validity is the only question presented by this petition for certiorari.

Through some mysterious process leguminous plants are able to take nitrogen from the air and fix it in the

[1] The product claims in suit are 1, 3, 4, 5, 6, 7, 8, 13, and 14. Claim 4 is illustrative of the invention which is challenged. It reads as follows:

"An inoculant for leguminous plants comprising a plurality of selected mutually non-inhibitive strains of different species of bacteria of the genus Rhizobium, said strains being unaffected by each other in respect to their ability to fix nitrogen in the leguminous plant for which they are specific."

[2] The patent also contains process claims.

plant for conversion to organic nitrogenous compounds. The ability of these plants to fix nitrogen from the air depends on the presence of bacteria of the genus Rhizobium which infect the roots of the plant and form nodules on them. These root-nodule bacteria of the genus Rhizobium fall into at least six species. No one species will infect the roots of all species of leguminous plants. But each will infect well-defined groups of those plants.[3] Each species of root-nodule bacteria is made up of distinct strains which vary in efficiency. Methods of selecting the strong strains and of producing a bacterial culture from them have long been known. The bacteria produced by the laboratory methods of culture are placed in a powder or liquid base and packaged for sale to and use by agriculturists in the inoculation of the seeds of leguminous plants. This also has long been well known.

It was the general practice, prior to the Bond patent, to manufacture and sell inoculants containing only one species of root-nodule bacteria. The inoculant could therefore be used successfully only in plants of the particular cross-inoculation group corresponding to this species. Thus if a farmer had crops of clover, alfalfa, and soy beans he would have to use three separate inoculants.[4] There had been a few mixed cultures for field legumes. But they had proved generally unsatisfactory

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[3] The six well-recognized species of bacteria and the corresponding groups (cross-inoculation groups) of leguminous plants are:

Rhizobium trifolii	Red clover, crimson clover, mammoth clover, alsike clover
Rhizobium meliloti	Alfalfa, white or yellow sweet clovers
Rhizobium phaseoli	Garden beans
Rhizobium leguminosarum	Garden peas and vetch
Rhizobium lupini	Lupines
Rhizobium japonicum	Soy beans

[4] See note 3, *supra*.

because the different species of the Rhizobia bacteria produced an inhibitory effect on each other when mixed in a common base, with the result that their efficiency was reduced. Hence it had been assumed that the different species were mutually inhibitive. Bond discovered that there are strains of each species of root-nodule bacteria which do not exert a mutually inhibitive effect on each other. He also ascertained that those mutually non-inhibitive strains can, by certain methods of selection and testing, be isolated and used in mixed cultures. Thus he provided a mixed culture of Rhizobia capable of inoculating the seeds of plants belonging to several cross-inoculation groups. It is the product claims which disclose that mixed culture that the Circuit Court of Appeals has held valid.

We do not have presented the question whether the methods of selecting and testing the non-inhibitive strains are patentable. We have here only product claims. Bond does not create a state of inhibition or of non-inhibition in the bacteria. Their qualities are the work of nature. Those qualities are of course not patentable. For patents cannot issue for the discovery of the phenomena of nature. See *Le Roy* v. *Tatham*, 14 How. 156, 175. The qualities of these bacteria, like the heat of the sun, electricity, or the qualities of metals, are part of the storehouse of knowledge of all men. They are manifestations of laws of nature, free to all men and reserved exclusively to none. He who discovers a hitherto unknown phenomenon of nature has no claim to a monopoly of it which the law recognizes. If there is to be invention from such a discovery, it must come from the application of the law of nature to a new and useful end. See *Telephone Cases*, 126 U. S. 1, 532–533; *De Forest Radio Co. v. General Electric Co.*, 283 U. S. 664, 684–685; *Mackay Radio & Tel. Co.* v. *Radio Corp.*, 306 U. S. 86,

94; *Cameron Septic Tank Co.* v. *Saratoga Springs*, 159 F. 453, 462–463. The Circuit Court of Appeals thought that Bond did much more than discover a law of nature, since he made a new and different composition of non-inhibitive strains which contributed utility and economy to the manufacture and distribution of commercial inoculants. But we think that that aggregation of species fell short of invention within the meaning of the patent statutes.

Discovery of the fact that certain strains of each species of these bacteria can be mixed without harmful effect to the properties of either is a discovery of their qualities of non-inhibition. It is no more than the discovery of some of the handiwork of nature and hence is not patentable. The aggregation of select strains of the several species into one product is an application of that newly-discovered natural principle. But however ingenious the discovery of that natural principle may have been, the application of it is hardly more than an advance in the packaging of the inoculants. Each of the species of root-nodule bacteria contained in the package infects the same group of leguminous plants which it always infected. No species acquires a different use. The combination of species produces no new bacteria, no change in the six species of bacteria, and no enlargement of the range of their utility. Each species has the same effect it always had. The bacteria perform in their natural way. Their use in combination does not improve in any way their natural functioning. They serve the ends nature originally provided and act quite independently of any effort of the patentee.

There is, of course, an advantage in the combination. The farmer need not buy six different packages for six different crops. He can buy one package and use it for any or all of his crops of leguminous plants. And, as respondent says, the packages of mixed inoculants also

hold advantages for the dealers and manufacturers by reducing inventory problems and the like. But a product must be more than new and useful to be patented; it must also satisfy the requirements of invention or discovery. *Cuno Engineering Corp.* v. *Automatic Devices Corp.*, 314 U. S. 84, 90, 91, and cases cited; 35 U. S. C. § 31, R. S. § 4886. The application of this newly-discovered natural principle to the problem of packaging of inoculants may well have been an important commercial advance. But once nature's secret of the non-inhibitive quality of certain strains of the species of Rhizobium was discovered, the state of the art made the production of a mixed inoculant a simple step. Even though it may have been the product of skill, it certainly was not the product of invention. There is no way in which we could call it such unless we borrowed invention from the discovery of the natural principle itself. That is to say, there is no invention here unless the discovery that certain strains of the several species of these bacteria are non-inhibitive and may thus be safely mixed is invention. But we cannot so hold without allowing a patent to issue on one of the ancient secrets of nature now disclosed. All that remains, therefore, are advantages of the mixed inoculants themselves. They are not enough.

Since we conclude that the product claims do not disclose an invention or discovery within the meaning of the patent statutes, we do not consider whether the other statutory requirements contained in 35 U. S. C. § 31, R. S. § 4886, are satisfied.

Reversed.

SUPREME COURT OF THE UNITED STATES

No. 280.—October Term, 1947.

Funk Brothers Seed Company, v. Kalo Inoculant Company. | On Writ of Certiorari to the United States Circuit Court of Appeals for the Seventh Circuit.

[February 16, 1948.]

Mr. Justice Frankfurter, concurring.

My understanding of Bond's contribution is that prior to his attempts, packages of mixed cultures of inoculants presumably applicable to two or more different kinds of legumes had from time to time been prepared, but had met with indifferent success. The reasons for failure were not understood, but the authorities had concluded that in general pure culture inoculants were alone reliable because mixtures were ineffective due to the mutual inhibition of the combined strains of bacteria. Bond concluded that there might be special strains which lacked this mutual inhibition, or were at all events mutually compatible. Using techniques that had previously been developed to test efficiency in promoting nitrogen fixation of various bacterial strains, Bond tested such efficiency of various mixtures of strains. He confirmed his notion that some strains were mutually compatible by finding that mixtures of these compatible strains gave good nitrogen fixation in two or more different kinds of legumes, while other mixtures of certain other strains proved mutually incompatible.

If this is a correct analysis of Bond's endeavors two different claims of originality are involved: (1) the idea that there are compatible strains, and (2) the experimental demonstration that there were in fact some compatible strains. Insofar as the court below concluded that

the packaging of a particular mixture of compatible strains is an invention and as such patentable, I agree, provided not only that a new and useful property results from their combination, but also that the particular strains are identifiable and adequately identified. I do not find that Bond's combination of strains satisfies these requirements. The strains by which Bond secured compatability are not identified and are identifiable only by their compatability.

Unless I misconceive the record, Bond makes no claim that Funk Brothers used the same combination of strains that he had found mutually compatible. He appears to claim that since he was the originator of the idea that there might be mutually compatible strains and had practically demonstrated that some such strains exist, everyone else is forbidden to use a combination of strains whether they are or are not identical with the combinations that Bond selected and packaged together. It was this claim that, as I understand it, the District Court found not to be patentable, but which, if valid, had been infringed.

The Circuit Court of Appeals defined the claims to "cover a composite culture in which are included a plurality of species of bacteria belonging to the general Rhizobium genus, carried in a conventional base." 161 F. 2d 981, 983. But the phrase "the claims cover a composite culture" might mean "a particular composite culture" or "any composite culture." The Circuit Court of Appeals seems to me to have proceeded on the assumption that only "a particular composite culture" was devised and patented by Bond, and then applies it to "any composite culture" arrived at by deletion of mutually inhibiting strains, but strains which may be quite different from Bond's composite culture.

The consequences of such a conclusion call for its rejection. Its acceptance would require, for instance in the

field of alloys, that if one discovered a particular mixture of metals, which when alloyed had some particular desirable properties, he could patent not merely this particular mixture but the idea of alloying metals for this purpose, and thus exclude everyone else from contriving some other combination of metals which, when alloyed, had the same desirable properties. In patenting an alloy, I assume that both the qualities of the product and its specific composition would need to be specified. The strains that Bond put together in the product which he patented can be specified only by the properties of the mixture. The District Court, while praising Bond's achievement, found want of patentability. The Circuit Court of Appeals reversed the judgment of the District Court by use of an undistributed middle—that the claims cover a "composite culture"—in the syllogism whereby they found patentability.

It only confuses the issue, however, to introduce such terms as "the work of nature" and the "laws of nature." For these are vague and malleable terms infected with too much ambiguity and equivocation. Everything that happens may be deemed "the work of nature," and any patentable composite exemplifies in its properties "the laws of nature." Arguments drawn from such terms for ascertaining patentability could fairly be employed to challenge almost every patent. On the other hand, the suggestion that "if there is to be invention from such a discovery, it must come from the application of the law of nature to a new and useful end" may readily validate Bond's claim. Nor can it be contended that there was no invention because the composite has no new properties other than its ingredients in isolation. Bond's mixture does in fact have the new property of multi-service applicability. Multi-purpose tools, multivalent vaccines, vitamin complex composites, are examples of complexes whose sole new property is the conjunction of the properties of their

components. Surely the Court does not mean unwittingly to pass on the patentability of such products by formulating criteria by which future issues of patentability may be prejudged. In finding Bond's patent invalid I have tried to avoid a formulation which, while it would in fact justify Bond's patent, would lay the basis for denying patentability to a large area within existing patent legislation.

SUPREME COURT OF THE UNITED STATES

No. 280.—October Term, 1947.

Funk Brothers Seed Company, Petitioner, v. Kalo Inoculant Company.	On Writ of Certiorari to the United States Circuit Court of Appeals for the Seventh Circuit.

[February 16, 1948.]

Mr. Justice Burton, with whom Mr. Justice Jackson concurs, dissenting.

On the grounds stated by the Circuit Court of Appeals the judgment should be affirmed.

When the patentee discovered the existence of certain strains of bacteria which, when combined with certain other strains of bacteria, would infect two or more leguminous plants without loss of their respective nitrogen-fixing efficiencies, and utilized this discovery by segregating some of these mutually non-inhibitive strains and combining such strains into composite inoculants, we agree with Mr. Justice Frankfurter that the combinations so produced satisfied the statutory requirements of invention or discovery.[1] These products were a prompt and substantial commercial success, filling a long-sought and important agricultural need.

However, we do not agree that the patent issued for such products is invalid for want of a clear, concise description of how the combinations were made and used. The statutory requirement is that the inventor or discoverer—

> "shall file in the Patent Office a written description of the same, and of the manner and process of making, constructing, compounding, and using it, in such full,

[1] R. S. 4886, as amended, 46 Stat. 376; 53 Stat. 1212, 35 U. S. C. § 31.

clear, concise, and exact terms as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound, and use the same; and in case of a machine, he shall explain the principle thereof, and the best mode in which he has contemplated applying that principle, so as to distinguish it from other inventions; and he shall particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention or discovery . . . . No plant patent shall be declared invalid on the ground of noncompliance with this section if the description is made as complete as is reasonably possible." [2]

The completeness and character of the description must vary with the subject to be described. Machines lend themselves readily to descriptions in terms of mechanical principles and physical characteristics. On the other hand, it may be that a combination of strains of bacterial species, which strains are distinguished from one another and recognized in practice solely by their observed effects, can be definable reasonably only in terms of those effects. In the present case, the patentee has defined the combinations in terms of their mutually inhibiting and non-inhibiting effects upon their respective abilities to take free nitrogen from the air and place it in the soil. These combinations were discovered by observation of these effects—they are in practice identified by these effects for the commercial uses for which they are made. It is these effects that differentiate them from the other bacteria heretofore generally identified only as common members of the same species and not commercially valuable for use with leguminous plants of more than one of the groups named in the opinion of the Court. The identifi-

[2] R. S. 4888, as amended, 38 Stat. 958–959; 46 Stat. 376, 35 U. S. C. § 33.

cation of the strains stated in the patent is that which the patentee used in making the novel combinations of them that have been shown to be highly useful. There appears to be no question but that the petitioners are now able to identify and use the strains in the manner described in the patent. The record thus indicates that the description is sufficiently full, clear, concise and exact to enable persons skilled in the art or science to which this discovery appertains or with which it is most nearly connected to make, construct, compound and use the same. There is no suggestion as to how it would be reasonably possible to describe the patented product more completely. The patent covers all composite cultures of bacterial strains of the species described which do not inhibit each other's ability to fix nitrogen. Bacteriologists, skilled in the applicable art, will not have difficulty in selecting the non-inhibitive strains by employing such standard and recognized laboratory tests as are described in the application for this patent.

The statute itself shows that Congress has recognized the inherent difficulty presented. While this patent may not be technically a "plant patent" in the precise sense in which that term is used in this Section, the references in the Section to the differences in descriptions expected in mechanical patents and plant patents obviously support the position here taken. An inventor should not be denied a patent upon an otherwise patentable discovery merely because the nature of the discovery defies description in conventional terms. Terms ordinarily unsuitable to describe and distinguish products that are capable of description and distinction by their appearance may be the most appropriate in which to describe and distinguish other products that are not reasonably possible of identification by their appearance, but which are easily identified by their effects when being sought for or described by those skilled in the art.